

Oregon Greater Sage-Grouse Proposed Resource Management Plan Amendment and Final Environmental Impact Statement



Volume II

US Department of the Interior
Bureau of Land Management

June 2015



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CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

4.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

Changes to the environmental consequences between the Draft EIS and Final EIS are as follows:

- Analyses were updated as a result of reviewing additional literature, acreages were revised from updated data, and appendices are new or revised
- Updates were made, as appropriate, based on public comments received on the DEIS

4.2 INTRODUCTION

This chapter presents the direct and indirect impacts on the human and natural environment anticipated to occur from implementing the alternatives presented in **Chapter 2**, Proposed Action and Alternatives. **Chapter 5**, Cumulative Impacts, presents the impacts from past, present, and reasonably foreseeable future actions. The purpose of Chapter 4 is to describe to the decision maker and the public how the environment could change if any of the alternatives in **Chapter 2** were to be implemented. It is meant to aid in the decision of which RMPA, if any, to adopt.

Most sections in this document are titled “Impacts from XYZ.” Impacts from should be interpreted as those from resource management described in Chapter 2 for the resource being discussed.

This chapter is organized by topic, similar to **Chapter 3**, Affected Environment. Each topic area includes the following:

- A method of analysis section that identifies indicators and assumptions

- An analysis of impacts for each of the six alternatives that has been broken down by alternative

Each resource section in this chapter discusses impacts on the resource in question from proposed management actions within each alternative. The proposed management actions within each alternative are presented in Chapter 2. Existing resource conditions within the planning area are described in **Chapter 3**.

Many management actions proposed in Chapter 2 are planning-level decisions that do not result in direct on-the-ground changes. However, by planning for land use on surface estate and federal mineral estate administered by the BLM over the life of the plan, the analysis focuses on impacts that could eventually result in on-the-ground changes. No implementation-level decisions are part of this RMPA.

Some BLM management actions may affect only certain resources and alternatives. This impact analysis identifies impacts that may benefit, enhance, or improve a resource as a result of management actions, as well as those impacts that have the potential to impair a resource. If an activity or action is not addressed in a given section, either no impacts are expected, or the impact is expected to be negligible, based on professional judgment.

Resource and resource uses that were not carried forward for detailed review and the reasons they were not carried through are included in **Table 4-1**, Resources and Resource Uses Not Carried Forward for Detailed Analysis.

The BLM manages public lands for multiple uses, in accordance with the FLPMA. Land use decisions are made to protect the resources, while allowing for different uses of those resources, such as livestock grazing and mineral development. These decisions can result in trade-offs, which are disclosed in this chapter's analysis. The projected impacts on land use activities and the associated environmental impacts of land uses are characterized and evaluated for each of the alternatives.

Impact analysis is a cause-and-effect process. The detailed impact analyses and conclusions are based on the following:

- The BLM planning team's knowledge of resources and the project area
- Reviews of existing literature
- Information provided by experts in the BLM, other agencies, cooperating agencies, interest groups, and concerned citizens

Table 4-1
Resources and Resource Uses Not Carried Forward for Detailed Analysis

Resource and Resource Use	Rationale for Not Analyzing Resource or Resource Use in Detail
Air Quality and Climate Change	<p>Implementing management to protect Greater Sage-Grouse (GRSG) generally involves an increase in management intensity and the potential to increase criteria pollutants and greenhouse gas (GHG) emissions. Smoke from prescribed burning is the primary source of criteria pollutants from BLM management actions in the planning area. All areas within an Oregon Forest Protection District are required to comply with the directions in the Oregon Smoke Management Plan. This should limit the potential for additional adverse impacts on human health and visibility from prescribed burning, the primary source of criteria pollutants. Voluntarily adhering to the requirement of the smoke management plan outside of Forest Protection Districts would have the same impact; the BLM's voluntary compliance is very high. Thus, no additional adverse impacts on air quality are anticipated.</p> <p>Prescribed burning is also the primary source of GHG emissions from BLM management or authorized activities, although wildfires are often a more significant source than prescribed fires. It is not know if any of the alternatives would result in a significant change in prescribed burning, compared with Alternative A; this is due to the complexities of trade-offs between prescribed burning treatments inside versus outside GRSG habitat. Increased management intensity for restoring habitat would likely increase GHG emissions from internal combustion engines used to conduct treatment activities. However, the BLM lacks sufficient information to determine whether and to what degree GHG emissions would change under the different alternatives. Methods for estimating internal combustion engine emissions require knowledge of fuel type and engine type. The BLM does not have reliable estimates of fuel use, particularly for aircraft, heavy equipment, and small engines, such as chainsaws and pumps. GHG emissions from livestock grazing are very minor relative to other BLM activities. Absent an approved plan or nearly complete environment analysis concerning mineral extraction or construction in ROW grants, estimating GHG emissions from those activities would be speculative. The BLM lacks the information needed to estimate emissions from recreation on BLM-administered lands in the planning area.</p>
Fish and Wildlife (Fisheries and Aquatic Wildlife)	<p>Implementation of GRSG conservation measures would generally have a beneficial effect on wildlife species. Specific effects would depend on location, scale, and timing of projects. These elements of a project are identified during the design and planning of specific projects. Thus, any effect on wildlife would be identified at the project design and implementation phase.</p>
Cultural and Tribal Resources	<p>The RMPA decision does not authorize ground-disturbing activities, so there are no anticipated effects on cultural resources from identifying conservation actions for GRSG protection.</p>

The baseline used for the impact analysis is the current condition or situation, as described in Chapter 3. Impacts on resources and resource uses are analyzed and discussed in detail, commensurate with resource issues and concerns

identified through the RMPA/EIS process. At times, impacts are described using ranges of potential impacts or in qualitative terms.

Throughout Chapter 4, the reader will find numerous locations and disciplines where travel management minimization criteria have been analyzed, including, but not limited to, travel management, recreation, vegetation, wildlife (including GRS), and invasive plants. In addition, many of the BMPs and RDFs in **Appendix C** have been formulated to minimize impacts where they may occur.

4.2.1 Analytical Assumptions

Several overarching assumptions have been made to facilitate the analysis of the project impacts. These assumptions set guidelines and provide reasonably foreseeable projected levels of development that would occur in the planning area during the planning period. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative, as described in Chapter 2.

The following general assumptions apply to all resource categories. Any resource-specific or resource use-specific assumptions are provided in the methods of analysis section for that resource or resource use.

- Sufficient funding and personnel would be available for implementing the final decision.
- Implementing actions from any of the RMPA alternatives would be in compliance with all valid existing rights, federal regulations, agency policies, and other requirements.
- Implementation-level actions necessary to execute the RMP-level decisions in this RMPA would be subject to further environmental review, including that under NEPA, as appropriate.
- Direct and indirect impacts of implementing the RMPA would primarily occur on the public lands administered by the BLM in the planning area.
- The BLM would carry out appropriate maintenance for the functional capability of all developments.
- The discussion of impacts is based on best available data. Knowledge of the planning area and decision area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used for environmental impacts where data are limited.
- Restrictions (such as siting, design, and mitigation measures) would apply, where appropriate, to surface-disturbing activities associated with land use authorizations and permits issued on BLM-administered lands and federal mineral estate. There are

approximately 15 million acres of BLM-administered lands in the decision area.

- GIS data have been used to develop acreage calculations and to generate the figures. Calculations depend on the quality and availability of data. Acreages and other numbers are approximate projections, for comparison and analysis only. Readers should not infer that they reflect exact measurements or precise calculations. In the absence of quantitative data, best professional judgment was used. Impacts were sometimes described using ranges of potential impacts, or they were described qualitatively, when appropriate.
- New information may lead to changes in delineated GRS habitat. Habitat areas found to have been incorrectly mapped (e.g., nonhabitat inside PHMA or GHMA), or newly discovered leks and habitat areas that were missed in the most recent mapping efforts, may be identified. This adjustment would typically result in small changes to areas requiring the stipulations or management actions stated in this RMPA. Modifications to GRS habitat would be updated in the existing data inventory through RMP maintenance.
- A reasonably foreseeable development (RFD) scenario serves as a basis for analyzing environmental impacts from future leasing and development of mineral resources within a decision area. A variety of factors (e.g., economic, social, and political) are beyond the control of the BLM and will influence the demand for mineral resources. Therefore, an RFD scenario is a best professional estimate of what may occur if public lands are leased. It is not intended to be a “maximum-development” scenario; however, it is biased toward the higher end of expected development and shows where the potential development might occur. Leasing and development of geothermal resources in the Oregon Sub-region are based on the RFD scenario in **Section 2.5**, Reasonably Foreseeable Development Scenario, of the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (BLM and Forest Service 2008). The RFD scenario was created for a different analysis and not this RMPA/EIS. Additional information on the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States is provided on the BLM website at http://www.blm.gov/wo/st/en/prog/energy/geothermal/geothermal_nationwide/Documents/Final_P_EIS.html. RFD scenarios or supporting mineral potential reports were not completed for locatable minerals, salable minerals, leasable minerals, or nonenergy leasable minerals.

4.2.2 General Method for Analyzing Impacts

Potential impacts are described in terms of type, context, duration, and intensity, which are generally defined below.

Type of impact—Impacts are characterized as beneficial or adverse using the indicators described at the beginning of each resource impact section. The presentation of impacts for key planning issues is intended to provide the BLM decision maker and reader with an understanding of the multiple use trade-offs associated with each alternative.

Context—This describes the area or location (site-specific, local, planning area-wide, or regional) in which the impact would occur. Site-specific impacts would occur at the location of the action; local impacts would occur within the general vicinity of the action area; planning area-wide impacts would affect a greater portion of decision area lands in Oregon; and regional impacts would extend beyond the planning area boundaries.

Duration—This describes the duration of an effect, either short term or long term. Unless otherwise noted, short term is defined as anticipated to begin and end within the first 5 years after the action is implemented; long term is defined as lasting beyond 5 years to the end of or beyond the life of this RMPA.

Intensity—Rather than categorize impacts by intensity (e.g., major, moderate, or minor), this analysis discusses impacts using quantitative data wherever possible.

Direct and indirect impacts—Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place; indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

For ease of reading, analysis shown under Alternative A may be referenced in other alternatives with such statements as “impacts are the same as, or similar to, Alternative A” or “impacts are the same as Alternative A, except for...,” as applicable.

4.2.3 Incomplete or Unavailable Information

The CEQ established implementing regulations for NEPA, requiring that a federal agency identify relevant information that may be incomplete or unavailable for evaluating reasonably foreseeable significant adverse impacts in an EIS (40 CFR, Part 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included or addressed in an EIS. Knowledge and information is, and will always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing the RMPA. The BLM has made a considerable effort to acquire and convert resource data, from the BLM and from outside sources, into digital format for use in the RMPA.

Under FLPMA, the inventory of public land resources is ongoing and continuously updated. However, certain information was unavailable for use in developing the RMPA because inventories either have not been conducted or are incomplete. Examples of the major types of data that are incomplete or unavailable are GIS data used for disturbance calculations on private lands, site-specific surveys of cultural and paleontological resources, updating all of the lands with wilderness characteristics inventories, and mineral RFD scenarios and mineral potential reports.

For these resources, estimates were made concerning the number, type, and significance of these resources based on previous surveys and existing knowledge. In addition, some impacts cannot be quantified, given the proposed management actions. Where this gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent site-specific project-level analysis would provide the opportunity to collect and examine site-specific inventory data to determine appropriate application of RMP-level guidance. In addition, the BLM and other agencies in the planning area continue to update and refine information used to implement this plan.

4.2.4 Mitigation

This Chapter describes the environmental consequences associated with the impacts on GRSG and its habitat from activities carried out in conformance with this plan, in addition to BLM management actions. In undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. In addition, to help implement this Proposed Plan, a WAFWA Management Zone Regional Mitigation Strategy (see **Appendix E**) will be developed within one year of the issuance of the Record of Decision. The Strategy will elaborate on the components identified in Chapter 2 (avoidance, minimization, compensation, additionality, timeliness, and durability), and will be considered by the BLM for BLM management actions and third party actions that result in habitat loss and degradation. The implementation of a Regional Mitigation Strategy will benefit GRSG, the public, and land-users by providing a reduction in threats, increased public transparency and confidence, and a predictable permit process for land-use authorization applicants.

4.3 GRSG AND GRSG HABITAT

This section discusses impacts on GRSG from proposed management actions within each alternative. Existing conditions concerning GRSG are described in **Section 3.3**.

4.3.1 Methods and Assumptions

Indicators

This analysis is organized by threats to GRSG as categorized in the USFWS's *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (USFWS 2010a).

GRSG

Indicators of impacts on GRSG are as follows:

- Acres of sagebrush habitat
- Habitat degradation or restoration
- Habitat fragmentation or connectivity
- Population loss
- Direct disturbance to GRSG
- Understory of sagebrush

Assumptions

Three general categories of disturbance to habitats or disruption are the most influential on GRSG and their habitat: 1) disturbance and disruption from casual use; 2) disturbance and disruption from permitted activity; and 3) changes in habitat condition, such as from fire or invasive plants. The assumptions listed below are intended for large-scale planning-level analysis; project-level assumptions for NEPA may differ:

The analysis includes the following assumptions:

- GRSG habitat designations (e.g., PPH and PGH; **Table 4-2**, Acres of Designated GRSG Habitat Types by Alternative) are assumed to represent habitat adequate to maintain GRSG populations in the subregion. For Oregon, GRSG habitat designations were derived from modeling efforts based on 75 percent Breeding Bird Density and 75 percent lek connectivity models as well as known winter habitat, connectivity considerations, and other factors.
- This analysis uses PPH and PGH categories for Alternative A only to facilitate comparison across the other alternatives. There are currently no BLM-administered lands formally designated as PPH or PGH within the sub-regional planning area.

Table 4-2
Acres of Designated GRSG Habitat Types by Alternative

GRSG Habitat Type	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
PPH	4,547,043	0	0	0	0	0	4,547,005
PGH	5,662,632	0	0	0	0	0	5,660,150
Core Areas	0	0	0	0	4,547,043	0	0
Low Density	0	0	0	0	3,923,539	0	0
PHMA	0	4,547,043	4,547,043	4,547,043	0	4,547,043	1,929,580*
GHMA	0	5,662,632	5,662,632	5,662,632	0	5,662,632	5,628,628

*Includes SFA (Sagebrush Focal Areas)

Source: Oregon/Washington BLM 2013

- The Oregon sub-region RMPs being amended by this RMPA/EIS were not developed to directly manage PPH or PGH. This is because these habitat areas were not identified until after the RMPs were adopted. However, management actions and resource allocations in the RMPs can still affect PPH and PGH that happen to share the same area as a management action and resource allocation. In these instances, existing RMP management actions and resource allocations (which were adopted before the identification of PPH and PGH) influence these recently identified GRSG habitats and the species. Consequently, Alternative A identifies where resource allocations happen to coincide with PPH and PGH. Alternative A would neither result in the designation of PPH or PGH nor assign additional management actions to PPH or PGH.
- Habitat conditions and trends for each GRSG population area were determined by modeling vegetation dynamics such as wildfire, succession, insects and disease, habitat restoration projects (e.g., sagebrush seeding, grass seeding, and herbicide treatment of annual grass), prescribed fire, unmanaged grazing, conifer encroachment and treatment, mechanical sagebrush treatment, and fuels reduction projects using the Vegetation Dynamics Development Tool (VDDT) for Alternatives other than the Proposed Plan.
- Because GRSG are highly sensitive to habitat fragmentation, development, or changes in habitat conditions and require large, intact habitat to complete their annual life history, alternatives proposing to protect the most unfragmented GRSG habitat from disturbance are considered of greatest positive impact. These impacts can be described both qualitatively and quantitatively.
- Seasonal ranges of migratory and non-migratory GRSG are largely encompassed within GRSG habitat designations but are not sufficiently mapped to provide an assessment of precise direct impacts.

- Impacts on GRSB would accrue over a distance depending on the type of development:
 - Impacts from transmission lines constructed before 2002 are likely fully manifested (Hagen 2011). Co-locating new lines would have no additional impacts if the direct and indirect habitat disturbance were not to exceed the width of the existing, directly disturbed ROW and additional structures are not required.
 - Ground-disturbing activities could improve or degrade habitat or cause loss or gain of individuals, depending on the size of the area disturbed, the nature of the disturbance, the plant species affected, and the location of the disturbance; for example, juniper reduction treatments disturb the ground but typically improve habitat in either the short-term or long-term, depending on the phase of juniper treated.
 - A 4.25-mile (6.9-kilometer) avian predator foraging distance is assumed to adequately encompass possible direct and indirect effects (Boarman and Heinrich 1999; Leu et al. 2008; Coates et al. 2014; Howe et al. 2014) in instances where increased predation from infrastructure (e.g., power lines, wind turbines, communication towers, agricultural and urban development) is a threat. This effect varies based on presence of other landscape alterations (e.g., cover type fragmentation and conversion from sagebrush to nonnative grasses).
 - Energy extraction such as oil and gas, geothermal, and plan of operation mining influence GRSB to 11.8 miles (19 kilometers) based on direct impacts of field development, including associated infrastructure, noise, lighting, and traffic (Johnson et al. 2011; Naugle et al. 2011; Taylor et al. 2012).
 - Interstate highways influence GRSB to 4.7 miles (7.5 kilometers) and paved roads, primary and secondary routes up to 1.9 miles (3 kilometers) based on indirect effects measured through road density studies (Connelly et al. 2004; Holloran 2005; Lyon and Anderson 2003; Johnson et al. 2011). Typically a primary road is a state or county highway, a secondary road, or a smaller local road, including gravel roads, that has traffic. Generally, road-effect distances (the distance from a road at which a population density decrease is detected) are positively correlated with increased traffic density and speed (Foreman and Alexander 1998).

- Site-specific disturbances such as small-scale mining and mineral material sites at 1.6 miles (2.5 kilometers) based on indirect influence distance from estimated spread of exotic plants (Bradley and Mustard 2006)
- BMPs, RDFs, COAs, and standard operating procedures would be implemented for infrastructure to reduce impacts on GRSG. These are subject to modification based on subsequent guidance and new science.
- Short-term impacts would accrue over a timeframe of up to 10 years. Long-term impacts would accrue over timeframes exceeding 10 years.

4.3.2 Nature and Type of Effects

Ten of the 20 Oregon PACs indicate a substantial population decline in the last 10 years (see **Appendix D**, Adaptive Management Strategy). Factors related to the decline in GRSG distribution and abundance include habitat loss and degradation, disease (e.g., West Nile virus) and predation, chemicals, inadequate regulatory mechanisms and changes in land use (USFWS 2010a). Habitat loss and fragmentation reduces the land area available to support GRSG. It also increases opportunities for other types of disturbance, such as human activity, predation, wildfire, and spread of invasive plant species.

Loss and fragmentation of sagebrush habitats and inadequate regulatory mechanisms are the primary causes of the decline of GRSG, as cited as Factor A in the USFWS *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (USFWS 2010a). Factors in declining populations from habitat fragmentation are reductions in lek persistence and attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (USFWS 2010a). Threats posed by conversion to agriculture, infrastructure, wildfire, invasive plants, conifer encroachment, energy development, predation, and unmanaged grazing by livestock, free-roaming wild horses, and burros are all associated with loss, fragmentation and degradation of habitat.

Following publication of the USFWS's 2010 determination of GRSG as an ESA candidate species, the USFWS was tasked with developing conservation objectives for GRSG. Consequently, it formed the Conservation Objectives Team (COT) of state and USFWS representatives to develop conservation objectives for each MZ (USFWS 2013a).

This impacts section focuses on the threats identified in the COT report for Oregon: fire, invasive plants, conifer encroachment, energy development and mining, livestock grazing, free-roaming horses and burros, recreation, infrastructure, conversion to agriculture, urbanization, sagebrush elimination,

and isolation. The COT report threats for Oregon differ from the USFWS listing because the COT analyzed conservation threats by MZ and population area analysis to highlight the substantial threats to GRSG populations in each region (USFWS 2013a). This analysis covers only those COT report threats relevant to the Oregon sub-region.

COT Report Threat—Fire

Wildfire has burned over 1.5 million acres of GRSG habitat in the past decade and is one of the largest threats to GRSG habitat in Oregon. As discussed in **Section 3.3**, the 2012 fire season was record-setting, with 1,014,661 acres burned in Oregon. Two major fires burned over 500,000 acres in Vale District, and an estimated 225,000 acres in the Burns and Vale Districts.

While wildfires likely played an important role historically in creating a mosaic of herbaceous plant-dominated areas (disturbed recently) and mature sagebrush (disturbed less recently), current land use patterns have restricted the ability to support natural wildfire regimes. In Oregon, nineteenth and early twentieth century grazing practices, the introduction and spread of invasive plant species, and the attempted exclusion of fire in much of the twentieth century have all contributed to increasingly large and severe wildfires.

Sagebrush ecosystems are adapted to a particular fire regime. Big sagebrush (*Artemisia tridentata*) does not resprout after a fire but is replenished by wind-dispersed seed from adjacent unburned stands or by seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish itself within 5 years; however, a return to a full pre-burn community cover can take 15 to 100 years (Manier et al. 2013; Evers 2013). Wildland fire also increases opportunities for invasive annual grasses, such as cheatgrass and wind-dispersed invasive forbs, to expand (Brooks et al. 2004; Balch et al. 2012).

Slow rates of regrowth and recovery of sagebrush after disturbance, coupled with high rates of disturbance and conversion to introduced plant cover, are largely responsible for the accumulating displacement and degradation of the sagebrush ecosystem (Manier et al. 2013). Thus, preserving sagebrush against wildfire and limiting the use of prescribed burning is important to preserving GRSG habitat over both the short term and long term.

Controlled burning can treat fuel buildup and can assist in the recovery of sagebrush habitat in some vegetation types. Reseeding with native plants and long-term monitoring to ensure the production of GRSG cover and forage plants will assist vegetation recovery (NTT 2011).

Recreation can increase the potential for human-caused wildfire (Knick et al. 2011), although the number of human-caused fires in eastern Oregon is very low.

Impacts from Wildland Fire Management

Fire suppression may be used to maintain habitat for GRSG (NTT 2011). Fire suppression may preserve the condition of some vegetation communities, as well as habitat connectivity over the short term. This is particularly important in areas where fire frequency has increased as a result of annual grass invasion, or where landscapes are highly fragmented. Fire suppression may limit annual grass expansion, although evidence is lacking that it has thus far. In Oregon, spreading cheatgrass and other invasive plant species pose a considerable threat. Wildfire is one of the largest factors contributing to GRSG habitat loss in Oregon (Manier et al. 2013), and growing evidence suggests that fire suppression may be promoting larger and more severe fires by increasing fuel continuity, allowing for easier spread and more homogeneous burn patterns.

Prescribed burning may be prescribed to treat fuel buildup and can assist in the recovery of sagebrush habitat in some vegetation types, especially when conifer encroachment is also a threat. Prescribed burning can increase landscape heterogeneity, thereby reducing the risks of severe wildfire in large, homogeneous vegetation communities. However, it can also facilitate the spread or dominance of invasive plant species, including invasive annual grasses. GRSG biologists recommend avoiding the use of prescribed fire in areas with less than 12 inches average annual precipitation (e.g., Wyoming big sagebrush or other xeric sagebrush species; Connelly et al. 2000a; Hagen et al. 2007; Beck et al. 2009) and where the risk of increasing the abundance of invasive plants is significant.

Reseeding with native plants would encourage the production of GRSG cover and forage plants and would assist vegetation recovery (NTT 2011). Post-fire seeding success rates are low in the Warm-Dry Sagebrush Group. Here, the average annual precipitation is highly variable, generally less than 12 inches, particularly when only native plant species are used for reseeded. To some degree, the low success rate is due to the use of seed from climatically inappropriate sources. Provisional and empirical seed zones for most native rangeland plant species were established just in the past two to 3 years. Success rates are moderate to high in the Cool, Moist Sagebrush Group, where average annual precipitation exceeds 12 inches. While reseeded is not necessary after all prescribed burns, it is important to avoid prescribed burns in areas at high risk of invasive annual grass dominance. Furthermore, the COT report recommends avoiding prescribed burning in low elevation sagebrush communities and using it sparingly and with great caution in high elevation sagebrush communities. The specifics of where, when, and how to use prescribed fire in GRSG habitat should be addressed in site-specific project planning in order to best fit management actions with desired outcomes.

Indicators of potential impacts on GRSG from wildfire under the proposed alternatives are acres of sagebrush habitat, habitat fragmentation and population loss.

COT Report Threat—Invasive Plant Species

Nonnative invasive plants are one of the most important factors causing loss of sagebrush habitat in Oregon (Hagen 2011). An assortment of nonnative annuals and perennials are currently invading sagebrush ecosystems.

Invasive plants can alter plant community structure and composition, productivity, nutrient cycling, and hydrology and can competitively exclude native plant populations. In particular, invasive plants can reduce and eliminate vegetation that GRSG use for food and cover, resulting in habitat loss and fragmentation, and can also increase the risk of wildfire. The spread of invasive annual grasses such as cheatgrass (*Bromus tectorum*) has increased the frequency and intensity of fires (Balch et al. 2012). An assortment of invasive annuals and perennials and native conifers is currently invading sagebrush ecosystems.

Impacts from Vegetation Management

Landscapes with large, intact patches of sagebrush are preferred to avoid edge effects (degradation of habitat quality and disturbance to birds near habitat edges). Coates et al. (2014) found that common ravens selected edge-dominated areas, specifically edges between sagebrush and grasslands and nonnative cover types. In addition, GRSG require a diversity of herbaceous species and healthy native grasses, making management for high quality habitat important (Knick et al. 2011). The distribution of sagebrush is limited and the cost of habitat restoration is high; because of this, management plans that protect intact sagebrush and restore impacted areas strategically to enhance existing habitats—that is, increase connectivity of intact sagebrush—have the best chance of increasing high quality sagebrush cover (Connelly et al. 2004; Beck and Mitchell 2000, cited in Manier et al. 2013). Sagebrush-promoting vegetation treatments would increase the amount and quality of GRSG habitat.

Management and control of invasive plant species in GRSG habitat would decrease the spread of these species. Invasive plant species directly compete for water with native plants, and invasive annual grasses (e.g., cheatgrass and medusahead) increase the risk of adverse wildfire on sagebrush. To reduce the likelihood of invasive plant spread and the extent of current infestations, the BLM uses integrated invasive plant management techniques (BLM 1992b). To reduce invasive plant infestations, the BLM implements mechanical, chemical, and manual vegetation treatments and prescribed burning. Implementing BMPs may also help reduce the likelihood that invasive plants become established in GRSG habitat. These conservation efforts would reduce the impacts of invasive plants on sagebrush and would increase the availability of GRSG habitat. Use restrictions could also minimize the spread of invasive plants by limiting human activities that disturb soil and introduce seed.

Impacts from Wildland Fire Management

Fuels management actions, as described above, can also reduce invasive plants and create fire breaks. Current treatments and active vegetation management

typically focus on vegetation composition and structure for fuels management, habitat management, and productivity manipulation. All these techniques are used for improving the habitat and forage conditions for ungulates and other grazers, and for stabilizing surface soil in order to manipulate vegetation composition, increase productivity, or remove invasive plants (Knick et al. 2011). Distribution of these treatments can affect the distribution of GRSG and sagebrush habitats locally and across a region. Grazing reduces herbaceous cover and thus can reduce the spread of invasive grasses and limit fuel loads if applied annually before the grasses have cured (Connelly et al. 2004). More recent research has found that fall and winter grazing can also reduce the spread of invasive grasses, support bunchgrass growth, and lower fire risk on rangelands (Schmelzer 2009; Petersen 2012; GBEP 2014).

Indicators of potential impacts on GRSG from invasive plants under the proposed alternatives are acres of sagebrush habitat, understory of sagebrush, habitat degradation, and habitat fragmentation.

COT Report Threat—Conifer Expansion

The third most significant cause of loss of sagebrush habitat in Oregon is conifer expansion (Hagen 2011). Expansion of conifer woodlands, especially western juniper (*Juniperus occidentalis* var. *occidentalis*), while native to Oregon, threatens GRSG. This is because they do not provide suitable habitat, and mature trees displace shrubs, grasses, and forbs required for GRSG. Juniper expansion is also associated with increased bare ground and potential for erosion.

Trees also offer perch sites for raptors and ravens (Choates et al. 2014b), so woodland expansion would also represent expansion of predation threat, similar to perches on power lines and other structures (Manier et al. 2013). Miller et al. (2000) documented declines in sagebrush to approximately 20 percent of its maximum cover when conifers reached 50 percent canopy cover. In eastern Oregon, Baruch-Mordo et al. (2013) modeled GRSG demographics as a function of conifer stand characteristics and found that no leks remained active at conifer cover of greater than 4 percent within 0.6 mile of leks. This pattern corresponds with other studies that have demonstrated avoidance of conifer within 4 miles of active leks at very low level of encroachment (Doherty et al. 2008; Freese 2009; Atamian et al. 2010; Casazza et al. 2011).

Moreover, Baruch-Mordo et al. (2013) found that leks were more likely to be active where smaller trees were dispersed or where larger trees were clustered, although the authors noted that not all areas near leks had similar stand characteristics.

GRSG avoiding dispersed large trees near leks could be a response to avian predators, such as common ravens. Howe et al. (2014) found that ravens avoided larger woodland stands and selected lone trees or areas of one or two trees (although ravens were more likely to nest on or near transmission poles or other human-made towers). Ravens may avoid woodlands for nest sites

because of reduced prey visibility, as well as reduced ability to detect and defend against potential nest predators.

Impacts from Vegetation Management

To reduce the extent of conifer expansion, the BLM implements mechanical, chemical, manual vegetation treatments and prescribed burning. These conservation efforts are aimed at reducing the impacts of conifers on sagebrush and may increase the availability of GRSG habitat in the long term if treatment results are maintained.

Impacts from Wildland Fire Management

In addition, fuels management actions, as described above, can also reduce conifers and create fire breaks, though they may also contribute to habitat fragmentation.

COT Report Threat—Improper Livestock Grazing

Livestock grazing is the most widespread land use across the sagebrush habitat (Connelly et al. 2004). It affects soils, vegetation health, species composition, water, and nutrient availability over the short term and long term by consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly et al. 2004; NTT 2011).

Livestock grazing has been described as a diffuse form of biotic disturbance; unlike point sources of disturbance (e.g., a frequently used undeveloped campsite), livestock grazing exerts repeated pressure across the landscape over many years (Manier et al. 2013). Thus, the effects of grazing are not likely to be detected as disruptions but as differences in the processes and functioning of the sagebrush, riparian, and wetland systems (Manier et al. 2013). Grazing effects are not distributed evenly because historic practices, management plans and agreements, and animal behavior all lead to differential use of the range (Manier et al. 2013). Livestock often use riparian and wetland areas for water and shade. This can reduce riparian community conditions and hydrologic functionality at certain levels, which can reduce riparian community conditions. However, moderate levels of livestock use are generally considered compatible with maintaining perennial bunchgrass, with the level of sustainable use depending on a number of environmental factors (Hagen 2011). In addition, properly managed grazing could help restore functioning condition of riparian areas and could reduce litter and fine fuel loading, helping to reduce fire size and severity.

Impacts from Livestock Grazing and Range Management

Based on extensive research in many western states, Connelly et al. (2000) developed and Hagen et al. (2007) refined habitat criteria or indicators required by GRSG for specific seasonal needs (leks, breeding, summer, brood-rearing, and wintering). Livestock grazing is compatible with GRSG where these habitat indicators can be consistently maintained (Connelly et al. 2000; Crawford et al. 2004). Whether this is possible on any particular site depends on many factors

including the ecological site characteristics, grazing history of the site, precipitation zone, livestock involved, the grazing season, intensity, frequency and duration.

State and transition models provide a useful framework to consider these factors (Boyd et al. 2014; USFWS 2014b). Livestock grazing influences vegetation dominance over time due to chronic selective pressure that affects perennial plant condition, interspecific competition, and composition (Connelly et al. 2004).

The overall impact of livestock grazing on GRSG depends on site-specific management (Beck and Mitchell 2000; USFWS 2010a). Riparian areas and wet meadows used for brood rearing are especially sensitive to grazing by livestock (Beck and Mitchell 2000, Hockett 2002). Grazing practices can be used to reduce fuel load (Davies et al. 2010; Davies et al. 2011), to protect intact sagebrush habitat, and to increase habitat extent and continuity (Connelly et al. 2004).

Grazing can reduce the spread of invasive grasses, if applied annually before the grasses have dried out. Light grazing (21 to 40% of current years growth that has been used) to moderate grazing (41 to 60 percent of current year growth that has been used) does not appear to affect perennial grasses that are important for nest cover (Strand and Launchbaugh 2013). However, Reisner et al. (2013) found that unmanaged grazing can reduce density of native perennial bunchgrasses, thus facilitating cheatgrass invasion. Diamond et al. (2009) discuss how to target grazing to reduce fire risk when cheatgrass is present.

Grazing at inappropriate intensity, duration, season, or location may degrade sagebrush ecosystems over the long term, including changes in plant communities and soils. These impacts can lead to the following conditions:

- Loss of vegetation cover
- Reduced water infiltration rates and nutrient cycling
- Decreased plant litter on the soil surface
- Increased bare ground
- Decreased water quality
- Increased soil erosion, resulting in reduced overall habitat quality for GRSG (Knick et al. 2011; Manier et al. 2013)

Grass height is a strong predictor of GRSG nest survival, and increasing hiding cover can increase nest success, a demographic rate that explains a third of variation in population growth (Taylor et al. 2012; Doherty et al. 2014). DeLong et al. (1995) found lower predation rates on artificial nests at Hart Mountain, Oregon, were associated with tall grass cover and medium-height shrub cover. Similarly, a study at Hart Mountain and Jackass Creek showed that nests not

subject to predation were in areas of greater cover of residual grass, with medium-height shrubs, than were nests subject to predation (Gregg et al. 1994). Livestock grazing reduces grass height and can reduce GRSG nesting success (Beck and Mitchell 2000; Doherty et al. 2014).

Residual grass cover following grazing is essential to conceal GRSG nests from predators. Livestock may occasionally trample birds or nests or may disturb and temporarily displace lekking or nesting GRSG during movement or trailing (Coates 2007). They may directly compete with GRSG for available resources and indirectly reduce invertebrates that are important for GRSG.

Grazing infrastructure, such as water features and pipelines for livestock, can attract livestock to previously undisturbed habitat areas. This would artificially concentrate livestock impacts, such as heavy grazing and vegetation trampling (Braun 1998). As more reliable water developments are constructed, the individual effects of livestock at any one water source would be lessened as the congregation effects are spread to more areas. Specific levels of utilization at each water source would depend on several factors, including the number and distribution of water sources in a pasture, and livestock management practices.

GRSG may also use freshwater, although they do not require it because they can obtain their water needs from food. Research suggests that GRSG do not regularly use water developments even during relatively dry years but obtain required moisture from consuming succulent vegetation in the vicinity (Connelly et al. 2004). Information on the extent of habitat influenced by produced water and the net effects on GRSG populations is unknown (USFWS 2010a).

Standing water provided in livestock drinking troughs and stock ponds can serve as breeding grounds for mosquitoes that carry West Nile virus (Walker and Naugle 2011). GRSG are highly susceptible to West Nile virus and suffer high rates of mortality (Clark et al. 2006; McLean 2006). The disease was implicated in a die-off of at least 60 GRSG near Burns Junction and two other GRSG deaths near Crane and Jordan Valley in 2006 (Hagen 2011).

The primary vector of West Nile virus in sagebrush ecosystems is the mosquito *Culex tarsalis* (Naugle et al. 2004; Naugle et al. 2005; Walker and Naugle 2011). West Nile virus persists through a mosquito-bird-mosquito infection cycle (McLean 2006). Although *C. tarsalis* is able to overwinter and individual mosquitos emerge as infected adults in the spring (Clark et al. 2006; Walker and Naugle 2011), the species depends on the availability of warm pools of water for larval development. Artificial water sources may facilitate the spread West Nile virus in GRSG habitats because these water developments support abundant populations of *C. tarsalis* longer than natural, ephemeral water sources; this thereby provides habitat for the vector responsible for most West Nile virus infections (Walker and Naugle 2011).

Habitat occupancy by GRSG is related to multiple variables (not a single habitat indicator) associated with both local vegetation characteristics and landscape characteristics (Doherty 2010; Leu and Hanser 2011; USFWS 2013). Freese (2009) found that most of his study area in Oregon did not meet habitat guidelines (based on a single indicator), but patches imbedded throughout the study area did meet them, and most areas satisfied many but not all of the guideline requirements (Connelly et al. 2000). Doherty (2010) found that both local- and landscape-scale habitat features influenced nesting habitat selection by GRSG individually, but multi-scale models were more predictive.

These findings highlight both the importance and the difficulty of assessing and managing habitat for species that select habitat at multiple scales and use resources within large heterogeneous landscapes.

Methods to assess and monitor GRSG seasonal habitats must be consistent and repeatable across the species range if they are to provide data that can be upgraded from site scale to landscape scale. The BLM's Assessment, Inventory, and Monitoring (AIM) Strategy defines a set of core indicators and methods that can be integrated across BLM field, district, and state office boundaries (MacKinnon et al. 2011). Additional GRSG habitat indicators from the GRSG Habitat Assessment Framework (Stiver et al. 2010, or as updated) can easily be added to the core indicators and methods, as pilot studies in Oregon have demonstrated.

Water developments, roads, and structural range improvements associated with livestock grazing throughout the planning area would remove vegetation over the long term and could introduce invasive plants to rangelands. Livestock tend to congregate around water developments, compacting soil and trampling nearby vegetation, including shoreline and riparian areas. This makes reestablishment of native vegetation difficult in the area surrounding water developments. However, water developments and fencing also facilitate movement, distribution, and concentration of livestock more evenly across the range, thereby potentially improving rangeland health.

Land health evaluations are used to assess rangeland condition and help to identify where a change in grazing management would be beneficial to rangeland health. Managing grazing systems to protect sagebrush and riparian ecosystems would enhance vegetation by allowing more plant growth and reducing trampling and introduction of exotic species. Conversely, concentrating livestock grazing in certain areas would increase surface-disturbing impacts in those areas.

The BLM uses a number of mechanisms to reduce impacts from grazing on GRSG, where necessary. At the planning level, the BLM can decide where areas would be open and closed to livestock grazing. Future negative impacts would be reduced or eliminated within areas closed to grazing, but some past impacts would likely persist for some time. Closing areas to grazing may increase other

harmful impacts, such as fine fuel buildup and increased fencing to exclude livestock (Cagney et al. 2010).

Other more localized changes in management could occur at the implementation level during the permit renewal process. This generally occurs every ten years but could occur before 10 years. Permits may be renewed with or without changes, depending on whether standards (43 CFR, Part 4180.2[c]) and LUP or AMP objectives are being achieved. For example, at the implementation level, the BLM can consider changes in grazing practices or systems to ensure allotments meet rangeland health standards (see **Appendix N**), or they can restrict new grazing infrastructure in GRSG habitat areas. These changes could reduce grazing intensity or change the season of use. In addition, changes in grazing management in riparian and wet meadows can reduce impacts in these important seasonal habitats, depending on the specific situation. As discussed above, it is possible for light to moderate grazing to occur without degrading GRSG habitat.

Fences, especially woven wire, represent potential movement barriers and collision risk to GRSG. They provide predator perches and predator travel corridors, making them a potential cause of death for GRSG (Braun 1998). Fences also contribute to habitat fragmentation (USFWS 2010a). Adjustments in grazing management practices that meet habitat suitability requirements would enhance habitat for GRSG (e.g., changes in season of use, duration, and adjustment in numbers).

Impacts from Wild Horse and Burro Management

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across portions of the sagebrush biome. Wild horse and burro grazing has impacts similar to livestock grazing in their effect on soils, vegetation health, species composition, water, and nutrient availability. The causes are horses and burros consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly 2004), despite differences in grazing techniques and habits.

A horse consumes 20 to 65 percent more forage than a cow of equivalent body mass, due to physiological differences (Connelly et al. 2004). Horses and burros can reduce total vegetation cover, lower sagebrush canopy cover, increase fragmentation of shrub canopies, and lower species richness in GRSG habitat (Beever and Aldridge 2011). Additionally, because horses will use higher elevations and steeper slopes than cattle, wild horses graze areas of sagebrush that cattle do not typically use (Connelly et al. 2004). The effects of wild horses on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011, p. 18). Unlike livestock, wild horses and burros graze yearlong and can have more impacts on vegetation cover than livestock.

Water must also be available year-round for wild horses and burros in HMAs and wild horse territories (Wild and Free-Roaming Horses and Burros Act of

1971). This can result in riparian areas receiving yearlong use by wild horses and burros; this contributes to system degradation, which leads to protecting riparian areas with additional fencing and troughs in order to accommodate yearlong horse use. These types of range improvements would increase potential perch sites for avian predators and potentially less water naturally available. They also could limit water flow to riparian habitat.

The BLM will continue to manage wild horses and burros to AML. Currently, wild horse and burro populations on the range exceed AML and these high population levels worsen the negative impacts on GRSG habitat described above. It is likely that the BLM will continue to manage wild horses and burros to AML under all projected alternatives.

The indicators of potential impacts on GRSG from livestock and wild horse and burro grazing under the proposed alternatives are as follows:

- Disturbance to birds
- Population loss
- Acres of sagebrush habitat
- Understory of sagebrush
- Habitat degradation and fragmentation

COT Report Threats—Energy Development and Mining

Energy development can lead to impacts such as direct habitat loss, fragmentation of important habitats by roads, pipelines, and power lines, noise, and other human disturbance. Energy development may also have indirect effects on GRSG behavior or demographics due to noise and other disturbances (Blickley et al. 2012a; Blickley et al. 2012b; Blickley and Patricelli 2012; Blickley and Patricelli 2010). The effects of energy development often add to the impacts from other sources and can result in GRSG population declines. These declines associated with energy development result from the abandonment of leks, decreased attendance at the leks that persist, lower nest initiation, poor nest success, decreased yearling survival, and important wintering habitat avoidance in areas where there is energy infrastructure (Holloran 2005; Aldridge and Boyce 2007; LeBeau 2014).

Energy development impacts GRSG and sagebrush habitats through direct disturbance and habitat loss from well pads, access construction, roads, power lines, and pipeline corridors. Its indirect effects are from noise, changes in water availability and human presence (Patricelli et al. 2013; Ambrose and Florian 2013). The interaction and intensity of effects could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004; Holloran 2005). Little coal, oil, or gas potential exists in the planning area, but wind and geothermal energy development potential is high (Manier et al. 2013).

Renewable energy facilities, including wind and geothermal power, typically require many of the same features for construction and operation as do nonrenewable energy resources. Therefore, impacts from direct habitat loss, habitat fragmentation through roads and power lines, noise, and increased human presence are generally similar to those discussed for nonrenewable energy development (USFWS 2010a). In a Wyoming study, LeBeau (2014) found that the risk of a nest or brood failing decreased as the distance increased from a wind turbine; female survival did not appear to be affected by the relative distance to roads and transmission lines, although the relationship was not substantial because of the 90 percent confidence intervals.

Surface and subsurface mining for such mineral resources as gold, uranium, copper, phosphate, diatomaceous earth and aggregate, results in direct loss of GRSG habitat, if it occurs in sagebrush habitats. The direct impact from surface mining is usually greater than it is from subsurface activity. In otherwise undisturbed sagebrush, habitat loss from both types of mining can be exacerbated by the storage of overburden (soil removed to reach subsurface resource). If infrastructure is necessary, additional direct loss of habitat could result from structures, staging areas, roads, and power lines.

GRSG could be directly affected from vehicle collision on access roads, and nests could be trampled by human traffic in the vicinity of roads. GRSG could be impacted indirectly from an increase in human presence, land use practices, ground shock, noise, dust, reduced air quality, degradation of water quality and quantity, and changes in vegetation and topography (Brown and Clayton 2004). All these impacts may be reduced by adherence to state and federal regulations as well as BMPs and COAs.

The presence of new structures on the landscape would also contribute to indirect effects from potential avoidance behavior by GRSG (Freese 2009). Industrial activity associated with the development of surface mines and infrastructure could result in noise and human activity that disrupt the habitat and life cycle of GRSG. The number of displaying GRSG on 2 leks within 1.25 miles of active mines in northern Colorado declined by approximately 94 percent over 5 years, following an increase in mining activity, though limited recovery occurred subsequently (Remington and Braun 1991; Braun 1998). Studies have consistently reported that breeding GRSG were negatively impacted at conventional well pad densities (1 pad per 80 acres). Declines in lek attendance by male GRSG and associated with these well densities ranged from 13 to 79 percent. A recent summary of studies investigating GRSG response to natural gas development showed impacts on leks from energy development were most severe when infrastructure occurred near leks. It also showed that impacts remained discernible to distances of up to four miles (Naugle et al. 2011). A 21 percent decline in GRSG population growth pre- and post-development in one study was primarily attributed to decreased nest success and adult female annual survival; the treatment effect was more noticeable

closer to gas field infrastructure. Annual survival of individuals reared near gas field infrastructure (yearling females and males) was significantly lower than control individuals not reared near infrastructure (Holloran 2005; Holloran et al. 2010).

Indicators of potential impacts on GRSG from energy development and mining under the proposed alternatives are disturbance to birds, population loss, acres of sagebrush habitat, habitat degradation, and habitat fragmentation.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

Transmission lines and major power lines are widespread throughout GRSG range (Connelly et al. 2004). The species responds negatively to increased infrastructure in sagebrush habitats, including roads, power lines, and communication towers (Knick and Connelly 2011; Johnson et al. 2011). In areas where the vegetation is low and the terrain is relatively flat, power poles provide an attractive hunting and roosting perch and nesting sites for many species of raptors and corvids (Steenhof et al. 1993; Connelly et al. 2000; Howe et al. 2014; Choates et al. 2014).

The increased abundance of raptors and corvids in occupied GRSG habitats can increase predation. For example, within a year of construction of a 372.5-mile transmission line in southern Idaho and Oregon, raptors and common ravens began nesting on the supporting poles (Steenhof et al. 1993). Within 10 years of construction, 133 pairs of raptors and ravens were nesting along this stretch. Raven counts increased by approximately 200 percent along the Falcon-Gondor transmission line corridor in Nevada within 5 years of construction (Atamian et al. 2007). Raven counts along this line subsequently declined after 2007 but increased again within the last 4 years to near 2007 levels (Nonne et al. 2013).

Ravens contributed to lek disturbances in the areas surrounding the transmission line (Atamian et al. 2007); however, as a cause of decline in surrounding GRSG populations, it could not be separated from other potential impacts, such as West Nile virus. Nest success for this population was exceptionally low (Blomberg et al. 2010), suggesting a potential impact of ravens on GRSG nest survival, but pre-construction nest survival rates were not reported.

Following construction, GRSG avoidance of vertical structures, likely due to raptors perching on the structures, may exclude habitat via behavioral response. Braun (1998) found that use of otherwise suitable habitat by GRSG near power lines increased as distance from the power line increased for up to 660 yards; and based on that unpublished data, Braun reported that the presence of power lines may limit GRSG use within 0.6 mile in otherwise suitable habitat.

Golden eagle (*Aquila chrysaetos*) predation increased from 26 to 73 percent of the total predation after completion of a transmission line within 220 yards of an active GRSG lek in northeastern Utah (Ellis 1985). The lek was eventually abandoned, and Ellis (1985) concluded that the presence of the power line resulted in changes in GRSG dispersal patterns and caused the habitat to fragment.

Perch deterrents are often used to reduce the impact of avian predation. Prather and Messmer (2010) determined that the actual effectiveness of perch deterrents was limited by the structure of the power poles and the design and placement of deterrents. In contrast, Slater and Smith (2010) found raptor and raven perching was reduced on poles equipped with perch deterrents. Similarly, perch-deterrent devices installed one year after construction of an 18-mile power line significantly reduced raptor use in Wyoming (Oles 2007).

In addition, fences are often associated with power lines and communication towers. As discussed under grazing, fences also pose a hazard to GRSG from collision, provide perches for predators, and increase fragmentation risk. Stevens (2011, p. 108) in a study of GRSG and fence interactions in Idaho found several factors contributing to collision risk. Fences within 1.25 mile of leks, fence densities exceeding 0.6 mile per 0.4 square mile, and flat terrain posed greater risk.

Fencing in 13 GRSG Research Natural Areas (RNAs) will provide areas where natural successional processes will proceed for long-term monitoring and research of the plant communities important for GRSG. Some acreage next to the 15 RNAs would also be fenced in order to minimize fencing miles, to avoid disturbing leks, and to use existing pasture fences.

In the first study to examine the short-term impacts of wind energy infrastructure on GRSG, LeBeau (2012) found that GRSG did not avoid wind turbines during the nesting and brood-rearing periods. However, nest and brood survival decreased in habitats closer to wind turbines. GRSG avoided brood-rearing habitats within 3 miles of power lines; however, much of the habitat surrounding the transmission lines was mostly composed of a greater percent of bare ground, which is uncharacteristic of GRSG brood-rearing habitats. Moreover, the wind energy development was constructed only two years before this study, and habitat use patterns were likely related to high site fidelity inherent in GRSG (Fischer et al. 1993; Holloran and Anderson 2005). In the same study, LeBeau et al. (2014) noted the relationship between nest survival and distance to transmission lines was not substantial because of the large variation in the data. Female survival appeared not to be affected by wind turbines.

Higher densities of power lines within four miles of a lek negatively influence lek attendance (Walker et al. 2007). ROW exclusion areas would prohibit all development of ROWs; in ROW avoidance areas, ROWs would be considered

on a case-by-case basis. This flexibility may be advantageous where federal and private landownership areas are mixed and where exclusion areas may result in more widespread development on private lands. The 3 percent disturbance cap under certain action alternatives would protect GRSG habitat from excessive disturbance in ROW avoidance areas.

Travel management impacts are discussed under Recreation in this section.

Indicators of potential impacts on GRSG from infrastructure under the proposed alternatives are disturbance to birds, population loss, acres of sagebrush habitat, habitat degradation, and habitat fragmentation.

COT Report Threat—Recreation, Including Travel Management

Impacts from Recreation Management

Recreational use of GRSG habitat is benign in most situations; however, excessive use may disturb birds or nesting sites, degrade sagebrush habitat, or increase poaching (NTT 2011). Such activities as camping, bicycling, OHV use, and hunting utilize the network of BLM roads and trails that may impact sagebrush and GRSG. The disturbance is due to noise and dust, invasive plant spread, and wildlife behavior alteration (Knick et al. 2011). In addition, road and trail use may directly cause GRSG mortality via collisions with vehicles. The impacts of predation on GRSG can increase where habitat quality has been compromised by human activities, such as exurban and road development (e.g., Coates 2007; Bui 2009; Hagen 2011).

Closing or seasonally restricting roads used by recreationists in and around seasonal GRSG habitats may reduce the impacts on wildlife. Restricting permitted access to important habitat areas, based on seasonal use and coincident with GRSG activities, would also protect GRSG (Knick et al. 2011; NTT 2011).

Indicators of potential impacts on GRSG from recreation include acres of sagebrush habitat, disturbance to birds, and population loss.

Impacts from Travel Management

Ecological impacts of roads and motorized trails include mortality due to collisions, behavior modifications due to noise, activity and habitat loss, alteration of physical environment, leaching of nutrients, erosion, spread of invasive plants, increased use, and alteration by humans due to accessibility.

Road construction can divide and fragment vegetation over the long term, depending on the location of the road. Roads compact soil and allow the spread of wildfire and invasive plants (USFWS 2010a; Manier et al. 2013). Invasive plants can outcompete sagebrush and other vegetation essential for GRSG survival. Invasive plant species also increase wildfire frequencies, further contributing to loss of habitat (Balch et al. 2012).

However, road access is critical to facilitate fire suppression response, thereby preserving intact vegetation and preventing further fragmentation. Johnson et al. (2011) found that lek counts increased at greater distance from highways. However, Johnson et al. (2011) found the presence of secondary roads did not appear to influence lek trends. Literature suggests increased road length, traffic levels, and traffic activity during the early morning and within approximately 2 miles of leks all negatively influence male lek attendance (Holloran 2005; Forman and Alexander 1998).

Holloran (2005) found that rates of decline in GRSG male lek attendance in west Wyoming's Pinedale Anticline gas field increased as traffic volumes increased on main haul roads within 2 miles of leks. Holloran also found that attendance increased over a length of over 3 miles of main haul road within 2 miles of leks. Vehicle activity on haul roads during the daily strutting period had a greater influence on male lek attendance, compared to roads with no vehicle activity in the early morning. Traffic at even low volumes (1 to 20 axles per day) had a significant impact on male lek attendance. Much of the vehicles associated with the Pinedale Anticline gas field were multiple-axle tractor-trailers.

Closing and reclaiming unused, minimally used, or unnecessary roads in and around GRSG habitat would reduce disturbance there and would increase GRSG habitat when the roads are reclaimed (NTT 2011). The more areas that restrict motorized vehicle use, the less likelihood there would be for impacts on vegetation from surface disturbance, such as the following:

- Reduced acreage and condition of vegetation
- Increased likelihood for invasive plants
- Reduced number and size of special status plant populations and habitat quality and distribution

COT Report Threats—Sagebrush Removal, Agricultural Conversion and Urbanization, and Isolation

Over time, sagebrush habitats have been lost to agriculture and urban development, and past vegetation management strategies. Habitat loss also decreases the connectivity between GRSG wintering and brooding habitats, increasing population isolation and susceptibility to stochastic events, such as disease or drought (Caudill, Messmer, Bibles and Guttery 2013; Freese 2009; Waker; Doherty, Naugle, Walker, and Graham 2008). This then increases the probability for the loss of genetic diversity and extirpation of the population (Knick and Hanser 2011).

In addition to reducing the land area available to support GRSG, habitat loss and fragmentation also increases opportunities for other disturbances, such as vehicle traffic, predation, wildfire, and invasive plant spread. Agricultural development, landscape fragmentation, and human populations have the potential to increase predation pressure on all life stages of GRSG. Under these

conditions, birds can be forced to nest in less suitable or marginal habitats; this increases travel time through habitats where they are vulnerable to predation and increases the diversity and density of predators (Ritchie et al. 1994; Schroeder and Baydack 2001; Connelly et al. 2004; Coates et al. 2014).

Raven abundance has increased as much as 1500 percent in some areas of western North America since the 1960s (Coates and Delahanty 2010 and references therein; Coates et al. 2014). It is linked with increases in human activity, which provides supplemental sources of food, water, and nest sites (Bui et al. 2010). Structures in the environment increase the effect of raven predation, particularly in low canopy cover areas, by providing ravens with perches (Braun 1998; Coates 2007; Bui et al. 2010; Howe et al. 2014). Coates and Delahanty (2010) estimated an increase in one raven per 6-mile transect survey was associated with a 7.4 percent increase in the odds of GRSG nest failure.

While habitat conversion for agriculture is not directly tied to BLM management, land tenure decisions, such as acquisitions and disposals, can indirectly affect the acreage available for agriculture and urbanization. For example, if the BLM were to dispose of a land parcel characterized as sagebrush-steppe, the land could be converted to farmland or subdivided into home sites at the third party's discretion. Sagebrush habitat may be zoned as "Zone 1" and thus would be retained in BLM management. These lands would not be converted for agriculture or urbanization.

Exurban development (dispersed homes on small acreages) removes sagebrush and converts rangeland to urban use. Exurban development results in direct habitat loss and habitat fragmentation and the introduction of invasive plant species. Urban and exurban activities also increase the presence of predator subsidies, such as trash, landfills, and bird feeders (Coates and Delahanty 2010). This allows the numbers of GRSG predators (e.g., common ravens, red fox, skunks, and raccoons) to increase, which can have disproportionate impacts on GRSG.

Additionally, pets and hobby livestock may have negative impacts on GRSG through direct predation or disturbance, such as dogs chasing birds, or can result in habitat loss and the introduction of invasive annual grasses. Infrastructure associated with exurban development, such as power lines and roads, also results in habitat loss and fragmentation, provides perches for avian predators such as ravens, and possibly disturbs GRSG (USFWS 2013a).

Habitat can also be degraded by sagebrush growing beyond the habitat needs of GRSG. Sagebrush growth over 25 percent in warm-dry and over 30 percent in cool-moist sagebrush habitat is less favorable for GRSG. This is because it lacks the diversity of vegetation to support the species.

Indicators of potential impacts on GRSG from the conversion of habitat for agriculture or urbanization include acres of sagebrush habitat, connectivity of habitat patches, and population loss.

Impacts from Land Tenure Decisions

Land tenure adjustments made in GRSG habitat could reduce the habitat available to sustain GRSG populations. Land exchanges designed to decrease fragmentation of habitat would help GRSG populations (NTT 2011).

Impacts from Special Designations Management

While an ACEC may be designated specifically to benefit GRSG, most ACECs and other special designations (e.g., Wilderness and WSAs) are not. While GRSGs are not a relevant or important value in most special designations, and thus management is not tailored to protect them, restrictions on resource uses and management activities may confer some protection by limiting habitat fragmentation and loss from development.

Indicators of potential impacts on GRSG from conversion to agriculture and associated threats under the proposed alternatives are population loss, acres of sagebrush habitat, habitat degradation, and habitat fragmentation.

4.3.3 Impacts on GRSG from Management Actions Common to All Alternatives

Impacts from Vegetation Management

Under all alternatives, the BLM would continue to follow the policies of the Integrated Vegetation Management Handbook (H-1740-2) for vegetation management. These policies would control the spread of invasive plants, would limit conifer expansion, would restore sagebrush, and would provide other improvements for vegetation management in sagebrush habitat. Federal laws, subsequent NEPA, and District Integrated Invasive Plant Management Plans provide the framework and direction for appropriate invasive plant management activities.

Impacts from Lands and Realty

Under all alternatives BLM IM 2013-142 (Regional Mitigation) would mitigate for lost habitat from development of ROWs or transmission line features.

Impacts from Wild Horse and Burro Management

The BLM manages wild horses and burros to AML, but existing populations exceed AML. The principal factor affecting gather priorities is short- and long-term holding facilities that are at or near capacity, significantly reducing the numbers of excess wild horses and burros that can be removed from HMAs. This situation would continue in the foreseeable future under all alternatives.

Impacts from Invasive Plants

Under all alternatives, effective control of invasive annual grasses remains problematic due to the following:

- Extent of invasion
- Sizes of areas that would need to be successfully treated
- Changes in soil structure, chemistry, and biota, resulting from prolonged dominance by invasive annual grasses and high inter-annual variability in precipitation amount and timing that reduce the ability of native species to establish successfully

Successful treatment rates for annual grasses remains low, especially in warm-dry and shallow-dry sagebrush.

Impacts from Livestock Grazing

An umbrella programmatic Candidate Conservation Agreement (CCA) with the USFWS, the Oregon Cattlemen's Association, and the BLM now covers all GRSG habitat in Oregon on public lands. A BLM livestock grazing permittee enrolls an allotment under the Programmatic CCA by signing an individual allotment CCA with the BLM and USFWS. The CCA requires the permittee to implement conservation measures that will reduce or eliminate identified threats to GRSG. A similar programmatic agreement, called Candidate Conservation Agreement with Assurances (CCAA), covers most GRSG habitat in private and state lands in eastern Oregon (USFWS 2014b).

There are no other impacts common to all alternatives.

4.3.4 Alternative A

While GRSG may be protected under existing provisions of some LUPs, Alternative A relies on management guidance that does not reflect the most up-to-date science regarding GRSG. Some of the older LUPs lack a landscape-level approach to land planning.

There is no consistently applied GRSG vegetation management across all land use plans, though Oregon Standards for Rangeland Health incorporate objectives for maintaining, improving, or restoring vegetation communities, particularly sagebrush and riparian and wetland habitats. Standards apply across all programs, though guidelines have been developed only for livestock grazing. As a result, since 1997 there has been regulatory direction to preserve and improve vegetation communities for special status species habitat, including GRSG habitat (Standard 5). Thus, there is general direction to preserve and improve vegetation communities; however, such disturbances as road construction and mineral and ROW development would continue; this could result in impacts on GRSG, such as habitat loss, fragmentation, or degradation, as described in *Nature and Type of Effects*.

COT Report Threat—Fire*Impacts from Wildland Fire and Fuels Management*

Under existing management, the BLM can use prescribed fires in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, and increasing age-class or structural diversity. Older LUPs are often less specific but are generally consistent in allowing the use of prescribed fire to meet land management objectives. These include enhancing or maintaining healthy sagebrush ecosystems, though they often lack clear descriptions of desired conditions to guide use of prescribed fire. The guidance in newer plans is generally more specific with regard to desired conditions. No LUPs restrict how prescribed fires can be conducted other than that untargeted vegetation should be protected during prescribed fires.

Under Alternative A, typical practices associated with both prescribed fires and wildfires include the following:

- Treatments to limit the expansion of invasive plants in the burned area
- Seeding desirable species
- Resting domestic livestock grazing to promote recovery or development of the desired plant community

Rest periods following wildfire or prescribed fire are determined on a site-specific basis. Limiting wildfire size is a primary objective for wildfire responses in high-value areas, such as designated important habitat, commercial forests, and wildland-urban interface. In recent years, various directives and other policies have included sagebrush and GRSG habitat as a high-value resource.

Continuation of this management approach would protect sagebrush acreage. However, since the existing direction does not specifically target GRSG habitat as a priority in fuels treatment, fuels buildup may continue to occur in priority habitat, potentially contributing to habitat loss and fragmentation from wildfire.

COT Report Threat—Invasive Plant Species*Impacts from Vegetation Management*

Under Alternative A, current vegetation management would continue. Grazing methods, land treatments, and other improvements would be designed and monitored to accomplish objectives, including wildlife habitat needs. Current management programs designed to reduce invasive plants also benefit GRSG habitat, although most invasive plant treatments likely would continue to target invasive forbs over invasive annual grasses due to lower costs and higher success rates, allowing more acres to be treated for a given funding level.

Vegetation dynamics development tool (VDDT) modeling was completed to describe vegetation changes across all the alternatives for the short term (10 years) and the long term (50 years). **Table 4-3**, Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 10 Years, and **Table 4-4**, Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 50 Years, display these comparisons.

While the Baker population was not modeled, the trends for Baker population are expected to be very similar to those modeled, likely sharing more similarities with trends in subpopulation 902 (subpopulation closest to Baker).

Modeled results for Alternative A indicate habitat trends would be negative through year 50 for subpopulations 902 and 903 but would be up slightly by year 10 and generally stable through year 50 for subpopulations 904 and 906. For population P04, habitat trends would be upward through year 50. Overall, habitat trend would be slightly upward through year 10 and would decline back to current levels by year 50. No population would reach the target of 70 percent of the area, with sagebrush cover of 10 to 30 percent, in 10 or 50 years. The continued expansion of invasive annual grasses at a rate greater than the expected treatment success rate was the primary factor in the failure to attain the habitat goal.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Under Alternative A, current vegetation management would continue. Older LUPs are not explicit about removing juniper to promote GRSG habitat, but all promote healthy sagebrush ecosystems. Newer plans include retaining trees and stands as they were before Euro-American contact and provide approximate descriptors (e.g., trees older than 120 years in the Andrews and Steens RMPs). No plans necessarily target any one particular phase of juniper encroachment as phases had not been identified and described at the time the plans were prepared; however, costs and treatment success rates result in targeting primarily early phases of encroachment. Newer plans include general objective of reducing juniper encroachment but do not specify treatment rates. The Southeast Oregon RMP focuses treatment on GRSG habitat. Mechanical treatment is preferred to prescribed fire in areas where the risk of further annual grass expansion is high. It limits treatment to no more than 124,500 acres over the life of the plan, including juniper killed by wildfire. The Andrews RMP and Steens RMP both focus treatments on juniper less than 120 years old in sagebrush habitats. The Lakeview RMP focuses treatment near GRSG leks. The Upper Deschutes RMP does not focus on juniper treatments specifically but does focus treatments on shrub-steppe communities.

Table 4-3
Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 10 Years

Name of Population	Analysis Area ¹	Total Acres ²	Current Habitat ³ (Percent of Area)	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Northern	902	3.219	43	42	43	42	42	43	43
Great Basin	904	5.600	56	62	63	61	62	63	63
Western	903	5.330	56	54	56	55	52	54	56
Great Basin	906	1.136	30	35	36	35	36	36	35
Central Oregon	P04	2.905	44	46	47	46	45	47	47
	All	18.190	50	52	53	52	51	53	53

¹ Subpopulations 902 and 904 in Northern Great Basin population; subpopulations 903 and 906 in Western Great Basin population; subpopulation P04 is Central Oregon population; Baker population not modeled due to small area and BLM-managed lands (Connelly et al. 2004).

² Millions of acres, includes lands in adjoining states that are part of the subpopulation

³ Habitat defined as sagebrush cover 10-30 percent with predominantly native species understory without juniper

Table 4-4
Projected Percentage of GRSG Habitat in Preferred Condition in the Oregon Sub-region After 50 Years

Name of Population	Analysis Area ¹	Total Acres ²	Current Habitat ³ (Percent of Area)	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Northern Great Basin	902	3.219	43	40	42	37	45	41	42
	904	5.600	56	62	65	59	65	65	66
Western Great Basin	903	5.330	56	45	52	45	48	48	52
	906	1.136	30	35	38	33	43	38	37
Central Oregon	P04	2.905	44	50	54	48	57	53	54
	All	18.190	50	50	54	48	54	52	54

¹ Subpopulation 902 and 904 in Northern Great Basin population; subpopulations 903 and 906 in Western Great Basin population; subpopulation P04 is Central Oregon population; Baker population not modeled due to small area and BLM-managed lands (Connelly et al. 2004).

² Millions of acres, includes lands in adjoining states that are part of the subpopulation

³ Habitat defined as sagebrush cover 10-30 percent with predominantly native species understory without juniper

Grazing methods, land treatments, and other improvements under Alternative A would be designed and monitored to accomplish objectives, including wildlife habitat needs. Conifer removal projects would continue using mechanical means as well as prescribed burns. These approaches would continue, subject to budget limitations, to have success in reducing juniper extent and cover.

Assuming that all mechanical treatments are for juniper, the current treatment rate is 17,183 acres per year. If all these treatments had occurred within four miles of leks, the rate would be approximately 2 percent per year. The actual treatment rate is likely one percent or less, well under the estimated encroachment rate of 4.5 percent per year.

Treatments have not necessarily been focused on locations most likely to benefit GRSG, and treatment prescriptions may not provide the greatest benefit to GRSG. A vegetation treatment prescription is a documented set of actions to take in order to achieve a specific vegetation management objective. Treatment near leks has been controversial and, therefore, limited. In the absence of more specific direction, under Alternative A there is a low probability that sufficient treatment would occur near leks to maintain or restore habitat quality.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

As shown in **Table 2-10**, within PPH, 4,470,799 acres are open to grazing, while 46,187 acres are closed. Within PGH, 5,511,327 acres are open to grazing, with 123,715 acres closed.

Livestock grazing would continue to be managed through existing grazing management plans unless monitoring and new information or assessments indicate a change is necessary in existing management. Methods and guidelines from the existing RMPs would be used to achieve land health standards, maintain ecological conditions, and enhance wildlife habitat during implementation of grazing regimens. Monitoring would be used to track the effectiveness of grazing management practices and integrated ranch planning used to plan allotments as single units.

For livestock grazing allotments, land health assessments and other management evaluations would support rangeland health standards, which would provide for the health of rangeland vegetation that also supports GRSG and other wildlife. Standards for Rangeland Health and Guidelines for Grazing Management require periodic assessments of range conditions and adjustments to grazing practices to improve ecosystem function. Although the standards do not address specific GRSG habitat needs, in meeting Standard 5, native plant communities and animal habitats would be distributed across the landscape, with a density and frequency of species suitable to ensure reproductive capability and sustainability. Plant populations and communities would exhibit a range of age classes necessary to sustain recruitment and mortality fluctuations.

Grazing management guidelines vary in specificity in older land management plans; however, Standards for Rangeland Health and Guidelines for Grazing Management apply. Allowable grazing utilization levels can be adjusted as needed to correct unacceptable utilization levels or patterns of use. Newer plans often have some guidance related to drought, but IM 2013-094 provides detailed procedures for adjusting grazing during drought that apply to all LUPs. Permit modifications to improve GRSG habitat suitability would enhance understory vegetation.

Range improvements under Alternative A would be designed to meet both wildlife and range objectives for livestock grazing. Fences would be built or modified to permit passage of wildlife and to decrease GRSG risk of collision with fences. These modifications would reduce the risk of loss or disturbance of GRSG.

Where land health standards are not being met, and livestock grazing or wild horse and burro use is determined to be a factor, livestock or wild horse and burro management will be modified to make progress towards achieving desired conditions and suitable habitat conditions for GRSG. Riparian habitats would be managed to achieve or make significant progress towards achieving proper functioning condition, to maintain desired plant community for wildlife habitat, to improve watershed conditions, and to protect riparian acreage from excessive livestock use. Restricting livestock use, moving horses to another area, or changing timing and intensity of grazing in riparian areas would enhance riparian habitat for wildlife, including GRSG. These approaches would reduce the risk of habitat degradation or fragmentation from grazing.

Impacts from Wild Horse and Burro Management

Wild horse and burro management involves many of the same impacts on GRSG habitat as livestock management. Range improvements would be designed to meet both wildlife and range objectives for wild horses and burros and livestock; however, it also provides yearlong water access for wild horses and burros. If land health standards are not being met, the BLM would take appropriate action within HMAs to achieve objectives. If actions taken are not moving toward achieving objectives, adjustments in AML could be applied.

Riparian area protection for wild horses and burros requires fencing, which can conflict with GRSG protection. The wild horse and burro management handbook outlines how management has to conform to thriving natural ecological balance. The BLM manages wild horses and burros to AML; however, existing populations exceed AML, and the BLM is unable to gather wild horses due to the inability to accommodate the expense of maintaining the animals off the range. This situation would continue in the foreseeable future under all alternatives.

COT Report Threat—Energy Development and Mining*Impacts from Leasable Fluid Minerals Management*

Energy development and mineral exploration and extraction directly disturb GRSG and their habitat, as described under **Section 4.3.2, Nature and Type of Effects**. Under Alternative A, fluid mineral leasing and development, including oil, gas and geothermal, would continue on previously leased lands, though not all leased areas will ultimately be developed. **Table 2-11** shows GRSG habitat open and closed to fluid mineral leasing in GRSG habitat by alternative, for full estate and split-estate lands. **Table 4-5** shows the percent of each population affected by closure under current management. Under some alternatives, areas would be open to leasing but stipulations would be applied to new leases. Less than 10 percent of each population within PHMA and less than 1 percent of each population within GHMA would be affected by closure to fluid mineral leasing under Alternative A. The greatest protections would occur in the Western Great Basin and Central Oregon populations within PHMA. Development in PPH and PGH would continue to cause impacts on GRSG as described under **Section 4.3.2**.

Table 4-5
Percent of Populations Affected by Closure to Fluid Mineral Leasing—Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	PGH	PPH
Baker	0	0
Central	1.82	0.32
Northern Great Basin	13.20	13.66
Western Great Basin	32.05	25.68

Note to all population tables: GRSG Core Areas (PHMA) protect 90 percent of the GRSG population, representing over 550 lek sites in the Oregon sub-region across all landownerships (ODFW 2012b; p. 84, Table 21). Approximately 67 percent of PHMA and 68 percent of GHMA occur on BLM-administered lands (see Chapter 3, Table 3-1). Thus, the BLM extrapolates that 74 percent of the population (67 percent of 90 percent) would be affected by RMP allocations covering all of PHMA, and approximately 7 percent of the population (68 percent of 10 percent) would be affected by RMP allocations covering GHMA. Management applying to both PHMA and GHMA would affect approximately 81 percent of the population. Under this assumption, the BLM identified the percent of the GRSG population on BLM-administered lands in Oregon affected by the various BLM management allocations (closures, recommended withdrawals, etc.) in the tables.

Under existing regulations, permit stipulations such as NSO, CSU, or TL, on existing leases can be imposed only to the extent consistent with the rights of a mining claimant. Areas where TL stipulations are applied would be temporarily closed to exploration and development, surface-disturbing activities, and intensive human activity during identified timeframes. Some operations would be allowed at all times (e.g., vehicle travel and maintenance); however, construction, drilling, completions, and other operations considered to be intensive would not be allowed during the restricted timeframe.

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Table 2-11 shows acreage open and closed to nonenergy leasable mineral leasing in GRSG habitat by alternative; **Table 2-11** also shows acreage currently open and closed to salable mineral development by alternative.

Table 4-5, Percent of Populations Affected By Closure to Fluid Mineral Leasing—Alternative A, and **Table 4-6**, Percent of Populations Affected By Closure to Salable Minerals—Alternative A, below show the percent of each population affected by closure and withdrawal under current management. Less than 10 percent of Baker and Central populations within GHMA and less than one percent of these populations within PHMA would be affected by closure to fluid mineral or salable mineral development under Alternative A. The greatest protections would occur in the Northern Great Basin and Western Great Basin populations in PHMA and GHMA.

Table 4-6
Percent of Populations Affected By Closure to Salable Minerals—Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	PGH	PPH
Baker	0	0
Central	1.89	0.31
Northern Great Basin	13.49	13.47
Western Great Basin	31.30	25.18

For locatable minerals, mitigation measures would continue to apply to the proposed plans of operation, as the law allows. Approximately 1,016,278 acres (four percent) of the total federal mineral estate are withdrawn from locatable mining claims; new mineral exploration or mining would be precluded on these lands under all alternatives. Less than 1 percent of all populations would be affected by withdrawal from locatable mineral entry. **Table 2-11** shows acreage recommended for withdrawal in GRSG habitat by alternative. The BLM would review plans of operation in withdrawn areas and would consider purchasing claims where activities threaten GRSG or their habitat. **Table 4-7**, Percent of Populations Affected by Withdrawal from Locatable Mineral Entry—Alternative A, shows the percent of each population affected by closure and withdrawal under current management.

Overall, under current management, GRSG could continue to be threatened by habitat loss, fragmentation, and degradation and disturbance as a result of energy development in habitat areas.

Table 4-7
Percent of Populations Currently Affected By Withdrawal from Locatable Mineral Entry—
Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	PGH	PPH
Baker	0	0
Central	0.89	0.00
Northern Great Basin	8.04	4.97
Western Great Basin	41.17	31.79

COT Report Threat—Infrastructure

Impacts from Lands and Realty

Under Alternative A, ROWs for utilities, pipelines, and other human purposes, including wind farms, are considered on a case-by-case basis outside of exclusion areas. ROW consideration includes an analysis of impacts on leks and other wildlife habitat, regardless of the planning designation on the area. To place a ROW in an avoidance area, a deeper analysis must be done to ensure compatibility with the reason for the avoidance area designation. To place a ROW in an exclusion area, a LUPA would have to be completed, requiring much more intensive analysis. The BLM's current management approach is to co-locate ROWs when possible, and existing infrastructure corridors were established in the most optimal location, considering wilderness, WSAs, and other factors. Existing ROW corridors also monitor and treat invasive plants under current management. Road policies are discussed below under Recreation.

There are currently 857,564 acres of exclusion areas within the planning area and 3,445,685 acres of avoidance areas. The collocation approach provides limited protection for GRSG habitat from ROW construction, which is a cause of fragmentation, degradation and disturbance to GRSG. **Table 2-10**, shows ROW avoidance and exclusion areas under each alternative, and **Table 4-8**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas-Alternative A, below shows the percent of each population impacted. The Northern Great Basin and Western Great Basin populations have the greatest proportions within ROW avoidance and exclusion areas under Alternative A, with 10 to 14 percent of the populations affected. Current management already sites ROWs to minimize impacts on wildlife habitat, providing limited protection to GRSG from disturbance, habitat loss, and fragmentation.

Table 4-8
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas-
Alternative A

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	<0.01	<0.01
Northern Great Basin	14	10
Western Great Basin	12	12
Central Oregon	2	7

COT Report Threat—Recreation

Impacts from Recreation Management and Travel Management

Alternative A includes no specific recreation plan related to GRSG or their habitat. Recreation is one use of BLM roads. Under Alternative A, the BLM would continue to permit limited yearlong use for off-road vehicles, including aircraft landing, on the lands that it administers, which is a cause of disturbance to GRSG and degradation to their habitat. Currently, 6,811,890 acres are open to off-road motorized travel, 2,669,145 acres in PPH and 2,940,051 in PGH. Recreational use of wildlife habitat, especially OHV use, disturbs GRSG, potentially resulting in nest abandonment, and contributing to fragmentation of habitat. **Table 4-9**, BLM-Administered Acres of PHMA and GHMA and Percent of GRSG Affected by Travel Management Designations under Alternative A, shows the percent of the GRSG population within the decision area affected by travel management designations under current management. Nearly half of the GRSG population occurs in areas open to OHV use, with less than 2 percent in areas currently closed to OHV use.

Table 4-9
BLM-Administered Acres of PHMA and GHMA and Percent of GRSG Affected by Travel
Management Designations under Alternative A

Allocation	PHMA (acres)	GHMA	Percent Population Affected
Closed	48,450	143,637	1.7
Limited	1,828,999	2,576,796	33
Open	2,669,145	2,940,051	48

Under Alternative A, road and trail development is minimized in crucial big game or upland bird habitat; roads would be closed to OHV traffic where substantial resource impacts occur, including harm to wildlife or habitat. These policies would help limit disturbance of GRSG habitat during the nesting season.

COT Report Threats—Sagebrush Removal, Agricultural Conversion, and Urban Development***Impacts from Land Tenure Decisions***

Land tenure adjustments would be subject to current disposal, exchange, and acquisition criteria. These include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. This would likely include retaining or protecting areas with GRSG, which would maintain occupied habitats. Thus, management under existing land tenure criteria would retain GRSG habitat and other lands with high value to wildlife.

Sagebrush removal, a threat listed in the COT report, is equivalent to loss of habitat, which is one of the indicators for GRSG. Loss of sagebrush habitat is discussed as a possible outcome from many of the threats (fire, invasive plants, conifer expansion, grazing, energy development and mining, and infrastructure); management approaches to remedy these threats will also reduce sagebrush removal

Impacts from ACECs

No new ACECs to benefit GRSG would be designated under Alternative A. In PPH, 200,399 acres of existing ACECs would remain, along with 251,233 acres in PGH. While GRSG is not a relevant or important value in these ACECs, and thus management is not tailored to protect GRSG, some incidental protection may be conferred by restrictions on resource uses in existing ACECs.

Summary

Alternative A (current management) provides protection for GRSG through existing LUPs, which do not specifically protect GRSG habitat but protect important wildlife habitat and range quality. Newer land use plans would provide more specific protection to sagebrush than older plans, allowing for differing interpretations over time and creating uncertainty whether desired outcomes would be achieved. Alternative A has similar goals and objectives in many RMPs but puts few restrictions on energy or infrastructure development in habitat areas. Alternative A also maintains existing programs for land health assessment, control of invasive plants, and consideration of wildlife habitat.

4.3.5 Alternative B

Under Alternative B, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. Restrictions on resource uses such as ROW and mineral development would reduce habitat loss and degradation for GRSG, and to minimize loss of habitat connectivity and disturbance to populations. PHMA and GHMA would be designated (**Table 4-2**) and the BLM would implement numerous conservation measures, as described under the resource headings below, to reduce impacts from human activities in PHMA, including a maximum 3 percent disturbance cap to human activities, not including fire, in PHMA.

The National Technical Team (2011) recommended managing priority GRSG habitats such that discrete human disturbances cover less than 3 percent of the total GRSG habitat, regardless of ownership. The purpose of the disturbance cap is to steer development to areas where it will have the least impact on GRSG, be it public or private land. The cap would be administered cooperatively with counties and the State of Oregon.

GRSG have low tolerance to human disturbance, such as roads, oil and gas developments, and urban development, especially during the breeding season (Leu and Hanser 2011). Knick et al. (2013) reported 99 percent of leks (N = 3184) known to be active between 1998 and 2007 were in landscapes with less than 3 percent development, and all lands surrounding leks were less than 14 percent developed.

COT Report Threat—Fire

Impacts from Wildland Fire Management

Fire and fuels management actions proposed under Alternative B would protect mature sagebrush acreage from loss and GRSG from the disturbance associated with wildfire and prescribed burning. The management approach, however, could also lead to fuel buildup, which can result in more damaging fires over the long term. Fuels treatment would be designed and implemented with an emphasis on promoting sagebrush, after threats to life and property, reducing fire intensity for increased public and firefighter safety, protection of values at risk and promoting healthier, more resilient sagebrush landscapes. Sagebrush canopy would not be reduced below 15 percent unless fuels management objectives required it, and seasonal restrictions would be applied to fuels management. Rest periods would be required and invasive plants controlled with native seeds used for treatment wherever possible. Grazing livestock would be considered as an option to reduce fuel load. Grazing can be used to reduce fine fuel loading of grasses and forbs; however, heavy grazing can lead to changes in composition favoring non-palatable invasive plant species, which can in time lead to additional fuel management problems.

Priorities for fire suppression in Alternative B are not explicit but are consistent with the intent of the Federal Wildland Fire Management Policy. Desired conditions for sagebrush are not stated clearly enough in the alternative to provide sufficient guidance for use of fire or other fuel treatments. Alternative B strongly discourages use of prescribed fire in the Warm-Dry Sagebrush group, which can lead to a homogenous fuel bed where large expanses of high sagebrush density exist. Such homogeneous fuel beds typically produce highly damaging fires.

The alternative relies on fuel breaks to manage wildfire risks in Warm-Dry Sagebrush Group, but fuel breaks are generally ineffective on the 2 percent of wildfires that severely degrade or destroy most GRSG habitat (Louisa Evers,

personal communication). VDDT vegetation modeling (**Tables 4-3 and 4-4**) showed no effect on habitat trends from reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

Current management programs (Alternative A) are already designed to reduce invasive plants, which benefits GRSG habitat. Invasive plant control would be the same under Alternative B as Alternative A. The Standards for Rangeland Health and Guidelines for Grazing Management would still apply. In areas with older LUPs, there is higher uncertainty that desired outcomes would be achieved, since desired standards and targets for invasive plant reduction were often not specified in these plans.

Habitat restoration and vegetation management actions under Alternative B would prioritize restoration to reduce GRSG habitat loss, degradation, and fragmentation. The restoration and management of vegetation actions under Alternative B would require the following:

- Using native seeds in most circumstances
- Designing post-restoration management to ensure the long-term persistence of restoration
- Considering changes in climate
- Monitoring and controlling invasive plant species

Native seeds and post-restoration monitoring may already be occurring under current management, but Alternative B would make consideration of these factors mandatory in GRSG habitat. However, the restoration levels for crested wheatgrass seedings and livestock utilization levels are not specified, increasing the uncertainty of achieving desired outcomes.

Alternative B habitat trends from VDDT vegetation modeling (**Tables 4-3 and 4-4**) are generally stable through year 10 then begin slow decline through year 50 for sub-populations 902 and 903. For sub-populations 904, 906 and P04, habitat trends are slowly upward through year 50 with P04 showing the greatest increase by year 50 (more than 10 percent). Overall habitat trend is upward through year 50 with greatest increase in the first 10 years. Reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks had no effect on habitat trends.

This alternative has no specific objective for treating invasive plant species. It requires the use of integrated vegetation management and ecologically based

invasive plant management principles. The effects would likely be similar to Alternative A.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Current management programs (Alternative A) are already designed to reduce conifer spread, which benefits GRSG habitat. Habitat restoration and vegetation management under Alternative B also would prioritize restoration to benefit GRSG habitat but includes no specific objective for treating juniper. As a result, the restoration and management of vegetation actions would enhance GRSG habitat under Alternative B by requiring the following (which may already be occurring under current management):

- Using native seeds in most circumstances
- Designing post-restoration management to ensure the long-term persistence of restoration
- Monitoring and controlling invasive plant species.

Alternative B prioritizes areas with higher probability of success that would benefit GRSG, seasonal habitats thought to be limiting, and PHMA. Treatments would be focused more on locations and prescriptions likely to be designed to benefit GRSG. However, since no treatment rate is specified, it is not clear if the treatment rate would exceed the encroachment rate. Other than providing a clearer focus on GRSG habitat, the effects of Alternative B would be very similar to Alternative A.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Livestock Grazing and Range Management

Under Alternative B, acreage open for livestock grazing and available AUMs are the same as under Alternative A. Impacts on GRSG habitat from grazing, as described under **Section 4.3.2**, would continue under Alternative B. However, AMPs, and land health assessments in PHMA would be used to incorporate GRSG management objectives into grazing permit renewals for livestock or wild horses.

Because livestock grazing utilization levels are not specified under this alternative, management would default to existing plans. Standards for Rangeland Health and Guidelines for Grazing Management would continue to apply. Allowable utilization can be adjusted as needed to correct unacceptable utilization levels or patterns of use. Grazing infrastructure, such as water features and pipelines for livestock, would be concentrated away from wildlife habitat areas to minimize vegetation trampling. Standing water for livestock would not be placed in GRSG habitat to minimize spread of West Nile virus.

Fences in PHMA areas identified as detrimental to GRSG would be removed, modified, or marked to reduce collisions and mortality to birds.

Because guidance for livestock grazing management during drought is very general, priorities for assessments are not provided, no additional assessment other than what would occur under existing direction is described or required, and desired conditions are not clearly defined, this alternative is unlikely to improve livestock grazing management over Alternative A.

Impacts from Wild Horse and Burro Management

Impacts are similar to those under Alternative A, although incorporating GRSG habitat objectives in HMAPs and focusing land health assessments in HMAs would increase the potential that habitat issues are discovered sooner. The information obtained from HAF assessments would likely be used to make adjustments in management if they were needed to improve habitat conditions. Over time, this approach would improve sagebrush habitat quality and reduce habitat loss for GRSG caused by wild horse and burro grazing.

COT Report Threat—Energy Development and Mining

Under Alternative B, disturbance to GRSG from energy development and mining activities would be maximally avoided by closing all PHMA to unleased fluid minerals, nonenergy leasable minerals, and salable minerals. For locatable minerals, the BLM would recommend withdrawal of all PHMA from mineral entry. RDFs would avoid or minimize impacts in PHMA, to the extent the law allows.

By closing all PHMA to mineral development, it is possible that mineral activity would occur on private lands where impacts would result and would not need to be mitigated. Also, if the activity is transferred onto private lands, the BLM would have no control over reclamation requirements.

Impacts from Leasable Fluid Minerals Management

Geophysical exploration would be allowed within PHMA but only for obtaining information on fluid mineral resources, including geothermal, in adjacent areas outside of PHMA. Impacts on GRSG and their habitat would continue as a result of existing fluid mineral leases; however, RDFs and conservation measures would be applied to existing leases as COAs. In comparison to Alternative A, these measures would further reduce the impacts discussed under **Section 4.3.2. Table 4-10, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative B**, shows the percentage of each population affected by closure to fluid mineral leasing under Alternative B. Approximately one-third of the Northern Great Basin and Western Great Basin PHMA would be protected by closure to fluid mineral leasing, while less than 10 percent of the Baker and Central Oregon populations would be affected in PHMA.

Table 4-10
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.00	2.41
Central	0.88	6.37
Northern Great Basin	6.39	32.35
Western Great Basin	15.53	29.63

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

The policies proposed under Alternative B for mineral materials, nonenergy leasables, and locatable minerals are designed to protect sagebrush habitat from further degradation and fragmentation from these threats. In existing lease areas, surface facilities would be located outside PHMA or would be collocated in existing disturbed areas to the extent possible. In GHMA, surface disturbances would be minimized during activity level planning.

Table 4-11, Percent of the Populations Affected by Closures to Salable Minerals—Alternative B, shows the percentage of each population affected by closure to salable minerals under Alternative B. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be protected by closure to salable minerals, while less than 10 percent of the Baker and Central Oregon populations would be protected.

Table 4-11
Percent of the Populations Affected by Closures to Salable Minerals—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.00	2.38
Central	0.93	6.29
Northern Great Basin	6.67	31.93
Western Great Basin	15.46	29.25

In areas that cannot be completely closed to leasable mineral development or withdrawn from locatable mineral entry, the BLM would impose a NSO buffer for leasable minerals around leks and/or a 3 percent surface disturbance threshold in PHMA to the extent allowed by law. Once the 3 percent disturbance cap is met, no new surface disturbance would be allowed in PHMA until restoration has occurred.

For locatable minerals, areas in PHMA would be recommended for withdrawal from mineral entry based on risk to GRSG habitat. Existing claims would be subject to validity examination or buyout. Validity examinations or buyouts are expensive and time-consuming operations; if claims are found to be valid, the result could be loss of BLM land use controls. Buyouts of claims would require a mineral appraisal, another resource-intensive task.

Table 4-12, Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative B, shows the percentage of each population impacted by recommended withdrawal of locatable mineral entry under Alternative B. Approximately one-third of the Western Great Basin population would be protected by recommended withdrawal of locatable mineral entry, while less than ten percent of the Northern Great Basin, and less than one percent of Baker and Central Oregon populations would be affected.

Table 4-12
Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0	0
Central	0.89	0.00
Northern Great Basin	8.04	4.97
Western Great Basin	41.17	31.79

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

As shown in **Table 2-10**, PHMA would be managed as ROW exclusion areas (4,547,043 acres); GHMA would be managed as ROW avoidance areas (5,662,632 acres). ROW exclusion areas would protect GRSG habitat and reduce habitat fragmentation on BLM-administered lands as described under **Section 4.3.2**. ROW avoidance areas would also protect GRSG habitat but to a lesser degree than ROW exclusion areas.

The percentage of each population impacted by ROW exclusion or avoidance areas (including for wind) are shown in **Table 4-13**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative B.

Table 4-13
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance
Areas—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	<2	<1
Northern Great Basin	35	2
Western Great Basin	31	3
Central Oregon	6	2

Approximately one-third of the Northern Great Basin and Western Great Basin populations would be protected by ROW exclusion areas, while less than 10 percent of the Baker and Central Oregon populations would be affected. Less than 5 percent of all populations would be protected by ROW avoidance areas.

By not allowing ROWs on BLM-administered land within PHMA, all infrastructure in GRSG habitat areas would be forced onto private lands. This could cause increased fragmentation to private lands and may result in more widespread loss of GRSG habitat to infrastructure.

Alternative B also calls for relocation of designated infrastructure corridors outside habitat areas; however, this re-location is unlikely to be feasible because corridors were established in optimal locations and alternative locations are not available. Existing transmission corridors should be consolidated, and those in PHMA which cannot be re-located would be buried where feasible. New infrastructure would be avoided in key connectivity corridors. These corridors have been identified in Core Areas, but not outside such areas.

COT Report Threat—Recreation

Impacts from Recreation Management

SRPs would be issued in habitat areas only where the effects of recreation use were neutral or beneficial to GRSG habitat. OHVs would be limited to existing routes in PHMA.

Impacts from Travel Management

The BLM would continue to limit motorized vehicles to existing roads and trails until travel management planning evaluates roads for permanent or seasonal closure. Route construction in PHMA would be limited to realignments or built to minimum standards necessary, and redundant roads would be rehabilitated. **Table 4-14**, BLM-Administered Acres of PHMA and GHMA and Percent of Oregon Populations within Travel Management Designations under Alternative B, shows the percentage of GRSG populations within the decision area affected by travel management designations under Alternative B. While acres closed to

OHV use would not change, designating PHMA as limited to OHV use would protect over 75 percent of GRSG within the decision area. Less than 5 percent of GRSG would occur in closed or open areas.

Table 4-14
BLM-Administered Acres of PHMA and GHMA and Percent of Oregon Populations within Travel Management Designations under Alternative B

Allocation	PHMA (acres)	GHMA	Percent Population Affected
Closed (existing)	48,450	143,637	1.7
Limited	4,498,590	2,576,796	76
Open	0	2,938,846	3.5

During breeding season, recreation permits would not be issued in the vicinity of leks to promote nesting success. These policies would protect GRSG by limiting disturbance of its habitat from activities associated with recreation traffic. This could improve population stability and recruitment by increasing the availability of suitable habitat. However, impacts from dispersed recreation, such as hiking, biking, or horseback riding, would continue to disturb vegetation and GRSG in areas where they occur.

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions

No lands in PHMA would be available for disposal under Alternative B. As discussed above, current disposal, exchange, and acquisition criteria include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. Thus, sagebrush habitat under Alternative B would not be removed and would be protected from habitat conversion for agriculture or other uses. **Table 4-15**, Percent of the Populations Affected by Unavailability to Land Disposal (Zone I)—Alternative B, shows the percentage of each population affected by unavailability to land disposal under Alternative B. Approximately one-third of the Northern Great Basin and Western Great Basin sub-populations would be protected by unavailability to land disposal, while less than 10 percent of the Baker and Central Oregon populations would be affected.

Impacts from ACECs

No additional ACECs would be designated under Alternative B; impacts on GRSG would be the same as under Alternative A.

Table 4-15
Percent of the Populations Affected by Unavailability to Land Disposal
(Zone 1)—Alternative B

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	>2
Northern Great Basin	35
Western Great Basin	31
Central Oregon	6

Summary

Alternative B follows the National Technical Team (NTT) recommendation for protection of GRSG habitat. It provides a greater level of protection for GRSG than Alternative A, by designating PHMA and GHMA in habitat areas and by restricting development of ROWs, use of OHVs, and mineral leasing in PHMA. Alternative B also requires a greater focus on protecting sagebrush habitats than provided under existing land use plans and applies a maximum 3 percent disturbance cap in PHMA. However, Alternative B provisions are not all feasible, and management approaches are not explicit, resulting in higher uncertainty that desired outcomes would be achieved over time.

4.3.6 Alternative C

Under Alternative C, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. However, some actions under Alternative C would be counterproductive to conserving GRSG habitat. Management actions would be applied to all occupied GRSG habitats, both PHMA and GHMA (**Table 4-2**) and would apply a zero percent limit to surface disturbance in occupied habitat. Management would focus on removing livestock grazing from occupied habitats and passive approaches to restoration.

COT Report Threat—Fire

Impacts from Wildland Fire Management

The approach for fire suppression and emergency stabilization projects is essentially the same as that described under Alternative B. Alternative C does not clearly state desired conditions for sagebrush, nor is it explicit regarding fire suppression priorities. Like Alternative B, it relies on fuel breaks to manage wildfire risks in the Warm-Dry Sagebrush Group, which may be ineffective.

Additional policies would be included under this alternative to ensure availability of native seed. These restrictions would minimize impacts described under **Section 4.3.2** for the sagebrush ecosystem in these areas. Fire suppression in sagebrush areas would be less effective since fine fuels would increase in the absence of livestock grazing.

COT Report Threat—Invasive Plant Species*Impacts from Vegetation Management*

This alternative has no specific objective for treating invasive plant species. It requires the use of integrated vegetation management and ecologically based invasive plant management principles. Impacts from habitat restoration and vegetation management approaches would be similar to those described under Alternative A. However, Alternative C has an increased focus on restoration and it applies to a larger area (PHMA and GHMA), thus providing restoration and habitat enhancement for GRSG in a larger area over the long term.

Eliminating grazing in habitat areas under Alternative C would increase the likelihood of undesired levels of bunchgrass mortality following fire, and thereby facilitating invasive plant species expansion (Davies et al. 2009; Davies et al. 2014). Only mowing of existing fuel breaks would be allowed, with no creation of new fuel breaks. Mowed fuel breaks are often the least effective type of fuel break, and can become dominated by invasive plant species, as repeated mowing adversely affects vigor of native bunchgrass populations (Davies et al. 2012). Generally, mowed fuel breaks are less effective than bare ground. Fuel moisture and weather conditions at the time of the fire have a great impact on the effectiveness of any given fuel break.

In addition, juniper treatments using herbicide or prescribed fire would not be permitted, sustaining current encroachment rates and increasing likelihood of annual grass spread around trees and the likelihood of annual grass dominance following fire. Restrictions on herbicide use would decrease the effectiveness of invasive plant species control efforts and likely increase current expansion rates.

Alternative C habitat trends from VDDT vegetation modeling (**Tables 4-3 and 4-4**) are downward through year 50 for sub-populations 902 and 903. Habitat trends are upward through year 10 and then downward through year 50 for sub-populations 904 and 906. Habitat trends are upward through year 50 for sub-population P04 with the highest rate of change in the first 10 years. Overall, the habitat trend is upward through year 10 then downward through year 50, likely due to a 0.1 percent annual expansion in invasive grasses. The initial habitat improvement that occurs in some subpopulations is likely due to some recovery from fire and ingrowth from earlier structure stages into the preferred structure stage; however, after year 10, the inability to use some treatment methods results in continual degradation of habitat.

Overall, Alternative C may be the least effective of all the alternatives in controlling invasive plant species, and could contribute to population loss, loss of habitat, and habitat degradation and fragmentation.

COT Report Threat—Conifer Expansion*Impacts from Vegetation Management*

Impacts from habitat restoration and vegetation management approaches are similar to those described under Alternative A, but with an increased focus on restoration applied to a larger area (PHMA and GHMA).

Alternative C has no specific objective for treating juniper. It specifies the use of ecological site descriptions to identify desired vegetation community, which could be used to identify where juniper is uncharacteristic and an encroaching species. Treatments would be focused more on locations likely to benefit GRSG and prescriptions likely to be designed to benefit GRSG. The use of ecological site descriptions to identify desired plant community composition provides an additional method for identifying encroachment areas.

Since no treatment rate is specified, the current treatment rate would likely continue. Treatment near leks has been controversial and, therefore, is limited. There is low probability sufficient treatment would occur near leks to maintain or restore habitat quality. Since the current treatment rate is well under the estimated encroachment rate, habitat would continue to be lost. Much of the loss would be in the cool-moist sagebrush group, which is the most widely used for late brood-rearing, with some loss in the warm-dry sagebrush group at the ecotone with cool-moist sagebrush.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros*Impacts from Range Management*

Under Alternative C, 11,762,357 acres would be closed to livestock grazing within PHMA and GHMA (**Table 2-10**). Removal of permitted grazing uses in habitat would likely improve GRSG habitat by reducing impacts such as loss of herbaceous nesting cover, described under **Section 4.3.2**. Removal of grazing would also limit livestock damage to sensitive riparian areas used by GRSG and other wildlife, and reduce the need for standing water for livestock, which can contribute to the spread of West Nile Virus (Walker and Naugle 2011), though some water sources would likely be maintained for wild horse and burro populations.

However, because livestock grazing would not be permitted in occupied GRSG habitat, fuel buildup in bunchgrass habitat would be more likely, leading to higher probability of bunchgrass mortality during wildfire and lower resistance to invasion or dominance by annual grasses post-fire (Balch et al. 2012). The loss of permittee and lessee invasive plant control partnerships could further contribute to an increase in the spread of invasive annual grasses.

In the long term, the removal of livestock grazing permits on federal land may cause private ranches to be stocked more heavily to compensate for the loss of forage. Private rangelands could be converted to seeded pastures or ranches to

nonagricultural, uses such as recreation or development. All would result in loss or fragmentation of GRSG habitat. Lands retained in BLM management would not be converted to agriculture.

Additional fencing to separate grazing from non-grazing lands would increase the adverse effects of fencing on GRSG, such as raptor predation, potential GRSG and fence collisions, and habitat fragmentation discussed in **Section 4.3.2**.

Impacts from Wild Horse and Burro Management

Impacts from wild horse and burro management would be similar to Alternative A. Alternative C would close occupied habitat to grazing but would not address the fate of range improvements. Some range improvements that would otherwise be removed or not maintained in the absence of livestock grazing to benefit GRSG would have to be maintained to prevent a negative impact on wild horse and burro populations. Thus, beneficial impacts on GRSG would be limited from removing range improvements, such as reduced West Nile virus risk and less damage to vegetation.

Overall, the approach under Alternative C would be ineffective in reducing impacts on GRSG from wild horse and burro grazing and, in the long term, may decrease acres of sagebrush habitat and increase fragmentation and degradation, due to increased likelihood of destructive fires, and increased fencing, and potential loss of adjacent private rangeland.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Under Alternative C, closures to fluid mineral leasing and restrictive stipulations for oil, gas and geothermal development would be the same as under Alternative B. As described under Alternative B, RDFs and conservation measures would be applied as COAs to existing leases, and RDFs in PHMA would avoid or minimize impacts to the extent allowable by law. Alternative C would avoid leasing in occupied habitat (PHMA and GHMA) by closing it to new mineral leases or exploration permits. Existing leases would continue to impact GRSG and their habitat; however, RDFs and conservation measures would enhance protection of GRSG populations by minimizing the disturbances associated with approved fluid mineral development, discussed in **Section 4.3.2**, to the extent the law allows. **Table 4-16, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative C**, shows the percentage of each population affected by closures to fluid mineral leasing under Alternative C. Approximately 20 percent of the Northern Great Basin and Western Great Basin populations would be within areas closed to fluid mineral leasing in PHMA and GHMA, with approximately 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-16
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.45	1.49
Central	12.41	3.93
Northern Great Basin	19.08	19.96
Western Great Basin	20.42	18.28

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Impacts are as described under Alternative B. **Table 4-17**, Percent of the Populations Affected by Closures to Salable Minerals—Alternative C, shows the percentage of each population affected by closure to salable mineral development under Alternative C. Approximately 20 percent of the Northern Great Basin and Western Great Basin populations would be within areas closed to salable mineral development, with approximately 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-17
Percent of the Populations Affected by Closures to Salable Minerals—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.45	1.48
Central	12.35	3.91
Northern Great Basin	19.00	19.87
Western Great Basin	20.33	18.20

Table 4-18, Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative C, shows the percentage of each population affected by recommended withdrawal from locatable mineral entry under Alternative C. Approximately one-third of the Western Great Basin populations would be within areas recommended for withdrawal from locatable mineral entry, with approximately 10 percent of the Northern Great Basin and less than 1 percent of the Central Oregon population and the Baker population protected by these measures in PHMA and GHMA.

Table 4-18
Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0	0
Central	0.89	0.00
Northern Great Basin	8.04	4.97
Western Great Basin	41.17	31.79

Under Alternative C, mineral development impacts would be avoided over largest amount of habitat by closing PHMA and GHMA to new fluid mineral and salable mineral materials leasing, and recommending withdrawal of all occupied habitat from locatable mineral entry. These approaches would minimize habitat loss, fragmentation and degradation and disturbance to GRSG from energy development and mining on BLM-administered land (discussed in **Section 4.3.2**), but could have the indirect effect of pushing energy development activity to adjacent private lands, where BLM land use controls cannot be implemented.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

Under Alternative C, both PHMA and GHMA would be managed as ROW exclusion areas (10,682,124 acres), (**Table 2-10**). Establishing ROW exclusion areas would reduce fragmentation on BLM-administered land and would protect GRSG habitat, as described under **Section 4.3.2**. Under Alternative C, all corridors and tower-type ROWs are prohibited in GRSG habitat.

Re-locating infrastructure corridors outside habitat areas may not be feasible as these corridors were already established in areas intended to minimize impacts on wildlife, wilderness and WSAs. In addition, establishing ROW exclusion areas could result in pushing ROW impacts onto adjacent private lands. Given the absence of land use controls and management, this alternative could increase GRSG habitat fragmentation overall. **Table 4-19**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative C, below shows the percent of each GRSG population affected by ROW exclusion and avoidance, including for wind power, under Alternative C. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within ROW exclusion areas, with over 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-19
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance
Areas under Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	1	0
Northern Great Basin	33	0
Western Great Basin	34	0
Central Oregon	13	0

COT Report Threat—Recreation

Impacts from Recreation Management

Alternative C includes no specific recreation plan related to GRSG or their habitat; thus, disturbance and habitat degradation associated with recreational use would continue, though most recreational uses in GRSG habitat are considered benign.

Impacts from Travel Management

Under Alternative C, roads in occupied habitat would be closed or limited in order to minimize collision risk and limit habitat fragmentation. This approach is the most protective of GRSG of all alternatives. **Table 4-20**, BLM-Administered Acres of PHMA and GHMA and Percent of Oregon Populations within Travel Management Designations under Alternative C, below shows the percent of GRSG within the decision area affected by travel management designations under Alternative C. While acres closed to OHV use would not change, most (80 percent) of GRSG would be in areas limited to existing routes under this alternative.

Table 4-20
BLM-Administered Acres of PHMA and GHMA and Percent of Oregon
Populations within Travel Management Designations under Alternative C

Allocation	PHMA	GHMA	Percent Population Affected
	(acres)		
Closed (existing)	48,450	143,637	1.7
Limited	4,498,590	5,518,995	80
Open	0	0	0

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions

No lands in PHMA or GHMA would be available for disposal under Alternative C. As discussed above, current disposal, exchange, and acquisition criteria already include retaining lands with threatened or endangered species, high quality riparian habitat, plant and animal populations or natural communities of high interest. Private land may be acquired to enhance the conservation value of existing lands for GRSG and reduce habitat fragmentation. Although it is uncertain how much private land could be acquired under Alternative C, this management approach could increase the BLM acreage of enhanced sagebrush, compared with Alternatives A, B, and D, but could also contribute to GRSG habitat losses on private lands, as a result of eliminating grazing on BLM-administered lands. **Table 4-21**, Percent of the Populations Affected by Unavailability to Land Disposals—Alternative C, below shows the percentage of each population impacted by unavailability to land disposal under Alternative C. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas unavailable to land disposals, with over 10 percent of the Central Oregon population and 1 percent of the Baker population protected by these measures.

Table 4-21
Percent of the Populations Affected by Unavailability to Land Disposals—Alternative C

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	1
Northern Great Basin	33
Western Great Basin	34
Central Oregon	13

Impacts from ACECs

ACECs to protect GRSG would be designated as sagebrush reserves in PHMA, consisting of blocks of BLM-administered land that exceed 4,000 acres, covering a total of 4,546,622 acres. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in the specific location and would be more likely to protect intact GRSG habitats or populations than under Alternative A.

Summary

Alternative C would protect the largest amount of GRSG habitat from energy development and infrastructure on BLM-administered land. Alternative C includes a zero percent surface disturbance limit in PHMA. It would also establish new ACECs to protect GRSG. Under Alternative C, livestock grazing

would be removed from occupied habitats. This action would reduce impacts on GRSG from grazing on BLM-administered lands; however, it would entail other management changes, such as increased fencing and reduced invasive plant control efforts, leading to fine-fuel buildup that may contribute to more damaging wildfires. In addition, Alternative C relies on passive restoration for invasive plant and conifer invasion, which is less effective in maintaining GRSG habitat. Because these represent the largest threats to GRSG in Oregon, Alternative C provisions may be counterproductive for GRSG habitat, and represent a less effective conservation approach than currently provided under Alternative A.

4.3.7 Alternative D

Under Alternative D, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. Management and impacts would be similar to Alternative B, though Alternative D would incorporate more flexibility with the use of active management tools and adaptive management applied to resource uses to account for sub-regional conditions. PHMA and GHMA would be designated (**Table 4-2**). The BLM would require a cap of 3 percent disturbance in PHMA, from human disturbances not including wildfire, and would implement numerous conservation measures to reduce impacts from human activities in PHMA. This would reduce the likelihood for habitat loss, degradation, or fragmentation.

COT Report Threat—Fire

Impacts from Wildland Fire Management

Alternative D would manage wildland fire similarly to Alternatives B and C. Fire suppression would be prioritized in GRSG habitat, as described under Alternative B, though priorities for suppression of unwanted wildfires would differ somewhat. Alternative D also establishes objectives that would provide a quantifiable indication of progress, and includes fuel breaks as part of the overall approach of managing fuel continuity across landscapes. VDDT vegetation modeling (**Tables 4-3** and **4-4**) showed no effect on habitat trends from reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks.

Alternative D provides more explicit guidance for fire suppression policies. This provision would be more protective for areas governed by older plans than Alternative A. Alternative D also provides clearer desired conditions for sagebrush to guide use of fire and other fuel treatments than older plans in Alternative A and the other action alternatives, but it lacks clear desired conditions for juniper and crested wheatgrass seedings to guide use of fire and other fuel treatments. Alternative D allows use of both planned and unplanned ignitions as appropriate to meet habitat objectives in all sagebrush types.

Additional management flexibility and guidance would be incorporated to tailor management for specific vegetation communities. Fuels treatment would be

designed and implemented with seasonal restrictions on treatments within winter range, as described under Alternative C. Fire suppression in sagebrush areas would protect mature sagebrush acreage and GRSG from the disturbance associated with wildfire. Alternative D provides more specific direction for post-burn restoration activities such as seeding of perennial grasses, forbs and shrubs and may improve recovery rates of habitat compared with Alternatives A, B, and C.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

Impacts from habitat restoration and vegetation management on GRSG under Alternative D would be similar to Alternative B. Management would also prioritize restoration projects and would use the most current science when implementing restoration projects. Alternative D provides additional guidance for invasive annual grass treatments and measures to incorporate invasive plant prevention during wildfire response.

The guidance in Alternative D is more specific than in older LUPs and the other action alternatives, reducing likelihood of differing interpretations across administrative units and over time. However, because grazing utilization levels are not specified, management guidance from existing LUPs would continue to apply, which may be insufficiently protective of GRSG, though Standards for Rangeland Health and Guidelines for Grazing Management would still apply.

The habitat trend under Alternative D from VDDT vegetation modeling (**Tables 4-3** and **4-4**) is downward through year 10, then upward through year 50 for sub-population 902. Habitat trend is downward through year 50 for sub-population 903, and upward through year 50 for sub-populations 904, 906, and P04, with a 13 percent increase by year 50 in both 906 and P04. Overall, the habitat trend is upward through year 50 at a relatively steady rate.

The objective is to treat 30 percent of GRSG habitat within 10 years for a variety of purposes, including to control invasive plant species. It establishes priority areas for treatment, lists allowable control methods, and requires actions during land management activities and wildfire response intended to reduce the risk of additional spread and new invasions. It requires the use of integrated vegetation management and ecologically based invasive plant management principles.

If 30 percent of annual grass areas with at least 25 percent annual grass cover within four miles of leks were successfully treated, the annual treatment rate would be approximately 8,920 acres per year for 10 years. The current annual grass expansion rate is not known, so it is also not known if this treatment rate would slow or reverse the expansion of invasive annual grasses close to leks.

Overall, the risk of invasive plant spread is similar across Alternatives B, D, E, and F, and would contribute to reducing threats of habitat loss, fragmentation and degradation from invasive plants, though the current management (Alternative A) approach to addressing these threats is similar.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Habitat restoration and vegetation management under Alternative D has essentially the same provisions as Alternative B though Alternative D provides specific guidance and the clearest priorities for juniper treatment to reduce disturbance to GRSG and loss of sagebrush or sagebrush understory vegetation. This guidance would improve the likelihood for successful sagebrush restoration and GRSG habitat enhancement over the long term, compared with current management or the other action alternatives.

The objective is to treat 30 percent of GRSG habitat within 10 years for a variety of purposes, including to reduce juniper encroachment. This alternative leaves decision to BLM Districts to determine how to apportion the objective between juniper reduction, invasive plant species control, and other treatments to benefit GRSG habitat. It establishes priorities for juniper treatment, based on encroachment phase, habitat category (PHMA and GHMA), and the abundance of invasive plant species in the understory. It guides post-treatment seeding, allowable post-treatment juniper condition, and timing of prescribed burning during jackpot burning.¹

Treatments would be focused more on locations likely to benefit GRSG with prescriptions designed to benefit them. Since no treatment rate specific to juniper is established, it is not clear if the treatment rate would exceed the encroachment rate. Treating 30 percent of juniper within 4 miles of leks would treat approximately 24,150 acres per year for 10 years. The annual treatment rate would be roughly 3 percent, which is less than the estimated encroachment rate of 4.5 percent per year.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Under Alternative D, as shown in **Table 2-10**, there would be a small decrease acreage open for livestock grazing (4,408,539 acres open in PHMA, 63,785 less than Alternative A, and 5,514,479 acres in GHMA, 22,070 less than Alternative A). Guidance concerning livestock grazing management with respect to GRSG habitat is more specific than in Alternative B, reducing the probability of varying interpretations and increasing the probability of more standard approaches to

¹Burning scattered pockets of juniper fuels

livestock grazing management to support GRSG habitat quality and reduce degradation and loss of understory vegetation.

In addition, the BLM would prioritize allotments for processing of livestock grazing permits and leases and would prioritize land health assessments based on the type of allotment and time since last assessment. This would increase the probability that problem areas would be identified and corrections applied, and slightly increase the likelihood that livestock grazing management would be adjusted to address GRSG habitat concerns over Alternative B.

Range management structures and water sources would be avoided in GRSG habitat where possible, and range management structures and water features would be designed to minimize West Nile virus and other harmful impacts on GRSG, as under Alternative B. As a result, livestock grazing management under Alternative D would enhance GRSG habitat quality and reduce disturbance to GRSG more than under Alternative A, and potentially more than the other action alternatives.

Impacts from Wild Horse and Burro Management

Alternative D impacts from wild horse and burros management are similar to those described for Alternative B. Alternative D also provides guidance for prioritizing land health evaluations, which would improve the efficiency and response time to improve GRSG habitat conditions.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Under Alternative D, acres closed to fluid mineral leasing in PHMA and GHMA would be similar to Alternative A (see **Table 2-11**). However, acreage subject to stipulations, such as NSO, would apply within 4 miles of a lek, an increase in protection relative to Alternative A. In addition, operational constraints would be applied to existing leases for oil, gas, or geothermal energy. RDFs would avoid or minimize impacts in PHMA to the extent the law allows. A 3 percent disturbance cap would apply in PHMA. **Table 4-22**, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative D, below shows the percentage of each GRSG population affected by closures to fluid minerals under Alternative D. Approximately one-third of the Western Great Basin population would be within areas closed to fluid mineral leasing, with approximately 10 percent of the Northern Great Basin and one percent of the Central Oregon protected by these measures in PHMA and GHMA. None of the Baker population would be protected because the majority of the GRSG habitat is not on BLM-administered land.

Table 4-22
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0	0
Central	1.82	0.32
Northern Great Basin	13.20	13.66
Western Great Basin	32.05	25.68

These provisions would reduce the impacts of fluid mineral leasing and development on GRSG habitat loss, degradation, or fragmentation more than Alternative A, but less than Alternatives B or C.

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Under Alternative D, lands would be available to nonenergy leasable minerals subject to NSO stipulation. BMPs and restoration would be required on existing leases. PHMA would be closed to new salable mineral material site development. This would reduce impacts on GRSG habitat associated with nonenergy leasable and salable mineral development, though it could result in higher costs or air quality impacts from increased transport of materials. In addition, restrictions on salable mineral development on BLM-administered land could push development onto private lands, which are not subject to the 3 percent disturbance cap or other land use controls.

Table 4-23, Percent of the Populations Affected by Closures to Salable Minerals—Alternative D, below shows the percentage of each GRSG population affected by closures to salable minerals under Alternative D. Approximately 30 percent of PHMA in the Northern and Western Great Basin populations would be within areas closed to salable mineral development, along with 15 percent of Western Great Basin GHMA, less than 10 percent of the Northern Great Basin GHMA, and smaller percentages of Central Oregon and Baker populations PHMA and GHMA protected by these measures.

Table 4-23
Percent of the Populations Affected by Closures to Salable Minerals—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)	
	GHMA	PHMA
Baker	0.00	2.38
Central	0.93	6.29
Northern Great Basin	6.67	31.93
Western Great Basin	15.46	29.25

Alternative D includes no recommendation to withdraw GRSG habitat beyond existing withdrawals and recommended withdrawals; thus, locatable minerals development would be managed as described under Alternative A. The percent of populations affected by withdrawal from locatable mineral entry would also be the same as under Alternative A. Prospecting for nonenergy leasable minerals would be permitted after appropriate environmental review. However, this alternative would seek to minimize habitat loss and other impacts from locatable mineral development in PHMA by limiting surface disturbance to 3 percent.

Impacts from recommended withdrawals would be the same as Alternative A.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

PHMA would be managed as ROW avoidance areas (4,289,889 acres); no new ROW exclusion areas would be established for utilities, including wind power (**Table 2-10**). Exclusion areas already in place would remain in effect in PHMA, but all other areas in PHMA would be designated as avoidance areas (see **Table 2-10**). ROWs would be allowed in avoidance areas if the disturbance would be either under the 3 percent disturbance cap or would cause no measurable disturbance. ROW authorization would include evaluating and implementing effective mitigation to offset the resulting loss of GRSG habitat. The threat of avian predators on GRSG would be reduced through the RDF requiring perch deterrents on all power lines.

In GHMA, the actions described under Alternative D would consider ROW authorization on a case-by-case basis with assessments to determine impacts on GRSG habitat and connectivity, and prioritize location outside PHMA when possible.

This approach would circumvent potential impacts of ROW exclusion areas, such as habitat fragmentation and increased predation, in areas with mixed public/private landownership, where exclusion areas would result in re-locating ROWs onto adjacent private lands lacking BLM land use controls. If ROWs were avoided in sensitive GRSG habitat, Alternative D would protect GRSG habitat from loss and fragmentation by avoiding ROW construction; at the same time, it would retain the management flexibility to locate ROWs in less sensitive areas in order to preserve connectivity of PHMA. **Table 4-24, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative D**, shows the percentage of each GRSG population affected by ROW exclusion and avoidance, including wind power, under Alternative D. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within ROW avoidance areas, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

COT Report Threat—Recreation*Impacts from Recreation Management and Travel Management*

Impacts from recreation management and travel planning under Alternative D are the same as Alternative B.

Table 4-24
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance
Areas—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	0	>2
Northern Great Basin	0	35
Western Great Basin	0	31
Central Oregon	0	6

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development*Impacts from Land Tenure Decisions*

No lands in PHMA would be available for disposal under Alternative D unless involved in a land exchange that results in a more contiguous, better land area for GRSG habitat. Impacts from land tenure decisions are the same as Alternative B. **Table 4-25**, Percent of the Populations Affected by Unavailability to Land Disposals—Alternative D, shows the percentage of each GRSG population affected by unavailability to land disposal under Alternative D. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas unavailable to land disposals, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-25
Percent of the Populations Affected by Unavailability to Land
Disposals—Alternative D

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	>2
Northern Great Basin	35
Western Great Basin	31
Central Oregon	6

Impacts from ACECs

No additional ACECs would be designated under Alternative D; impacts on GRSG would be the same as under Alternative A.

Summary

Alternative D uses flexibility in application of development restrictions in GRSG habitat, using ROW avoidance but not exclusion areas, up to an allowable disturbance cap of 3 percent maximum human disturbance, not including fire. Less GRSG habitat would be protected from mineral development than under Alternatives B or C, but Alternative D does place lands under stipulations restricting use. In addition, Alternative D includes a 3 percent disturbance cap in PHMA, which would limit the amount of disturbance allowed in GRSG habitat. Allowable disturbance under the cap would require mitigation, to avoid, minimize, and apply compensatory mitigation for habitat loss. Alternative D provides a more specific approach than in LUPs and compared with the other action alternatives, reducing the likelihood of differing interpretations across administrative units over time. The flexibility in Alternative D allows management to adapt to regional conditions and would provide a high level of protection for GRSG habitat.

4.3.8 Alternative E

Under Alternative E, the BLM would manage to maintain, conserve, enhance, and restore GRSG habitat. Core area habitat and low density habitat would be designated (**Table 4-2**). Low density is a subset of GHMA that would be designated in other alternatives. In both core area and low density areas, the BLM would incorporate management flexibility to permit high value infrastructure with appropriate mitigation and BMPs tailored for the sub-region. A zero percent limit on human disturbance would apply in core area habitat. This alternative would also assist resource managers in achieving the population and habitat objectives of the ODFW State Plan.

COT Report Threat—Fire*Impacts from Wildland Fire Management*

Alternative E manages fire suppression using habitat designations of Core Area and Low Density habitats rather than PHMA or GHMA; Low Density habitat covers fewer acres than GHMA, thus providing protection to less GRSG habitat. Impacts from wildland fire management under Alternative E are similar to Alternative D, but differ in two aspects: Alternative E does not allow use of unplanned wildfires in Core Area habitat to meet habitat management objectives and it strongly discourages use of prescribed fire in the Warm-Dry Sagebrush Group. Limits on use of fire, either planned or unplanned, in the Warm-Dry Sagebrush Group are likely to be counterproductive where large expanses of high sagebrush density exist, because homogeneous fuel beds typically produce highly damaging burn patterns and promote annual grass invasion. Limits on use of natural unplanned ignitions in Cool-Moist Sagebrush Group would reduce the

probability of restoring fire as an ecosystem process and obstruct opportunities to use unplanned ignitions to control juniper.

These provisions could result in less effective fire management and more severe impacts on GRSG habitat from wildland fire compared with Alternative D, though all alternatives are relatively similar in their approach to fire management.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

Alternative E emphasizes controlling invasive plant species and using the habitat monitoring techniques in the ODFW plan. Invasive plant species will be managed through the following:

- Systematic detection surveys
- Priorities for invasive plant control
- Establishing invasive plant protection areas
- Providing guidance for detection, control and containment, prevention, and restoration

The approach under Alternative E is similar to Alternative B and also lacks specific guidance regarding target invasive plant control levels and crested wheatgrass restoration, increasing uncertainty that desired outcomes would be achieved. However, Standards for Rangeland Health and Guidelines for Grazing Management would still apply and would provide protection to GRSG habitat from degradation.

The habitat trend under Alternative E from VDDT vegetation modeling (**Tables 4-3 and 4-4**) is upward through year 10 then downward through year 50 for sub-population 902. The habitat trend is downward through year 50 for sub-population 903, and upward through year 50 for sub-populations 904, 906, and P04. Overall, the habitat trend is upward through year 10, then slowly downward through year 50. Reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks had no effect on habitat trends.

The goals of invasive plant management are to establish and maintain healthy, functioning sagebrush community with increased invasion resistance and to minimize the impacts of invasive plant species on GRSG habitat. This alternative calls for the following measures:

- Requires systematic surveys to detect and control new infestations
- Prioritizes areas with at least 20 percent composition of native understory species for control efforts

- Recommends establishing invasive plant prevention areas where infestations are currently limited
- Recommends using Invasive Plant Prevention Guidelines from the Center for Invasive Plant Management
- Recommends containing large infestations and provides a list of potential control measures
- Requires aggressive treatment of invasive plant species that threaten GRSG habitat and the use of BMPs to prevent reinvasion

Most recommended actions are already BLM policy and standard practice. Systematic surveys would increase the detection rate of new infestations. Developing restoration plans is no guarantee that funding would be provided to implement any plans. Aggressive treatment rates are not specified, and current treatment rates are based on provided funding.

The effective control of invasive annual grasses remains problematic due to the current extent of invasion and the size of areas that would need to be successfully treated. It would also be hampered by changes in soil structure, chemistry, and biota from prolonged dominance by invasive annual grasses that reduce the ability of native species to become established. Successful treatment rates for annual grasses would likely remain low, especially in warm-dry and shallow-dry sagebrush.

Alternative E lacks the comprehensive approach to vegetation management that is presented in the other action alternatives. Overall, it is uncertain whether the risk of invasive plant spread under this alternative would differ from Alternative A, B, D, or F.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Under Alternative E, there is no specific objective for treating juniper, and this alternative allows retaining up to 30 percent of GRSG range in juniper and other vegetation types. It promotes no net loss of sagebrush habitat by BLM resource area or district.

Juniper removal should promote a return of native plants. It recommends the use of encroachment phase to identify target treatment areas. It also provides direction on post-treatment seeding, allowable post-treatment juniper condition, and the timing of prescribed burning when jackpot burning in spring. It limits the size of burn blocks when broadcast burning juniper when sagebrush is present in the understory.

Soils are often not frozen in March and April, which would likely prevent jackpot burning of cut juniper. Burning when soils are frozen reduces the heat

pulse into the soil and increases the probability that dormant plants and seeds will not be killed by the burn. In addition, frozen ground is less susceptible to compaction from vehicles that may be driven out to a project site. Limiting the size of broadcast burn blocks would limit the use of landscape scale treatments, increasing costs and reducing treatment rates. Burn block size limits could result in prolonged disturbance of GRSG breeding in order to sufficiently reduce the degree of juniper encroachment near leks. There would be unknown consequences on success rate of GRSG breeding if treatment were concentrated around particular core areas. Treatments would be focused more on locations likely to benefit GRSG, with prescriptions designed to benefit GRSG.

Since no treatment rate is specified, the current treatment rate would likely continue. If treatment activities are more distributed across the landscape to minimize disturbance during breeding, then the rate of treatment may not be sufficient for it to maintain quality habitat over time near leks. Treatments would be focused more on locations likely to benefit GRSG, with prescriptions designed to benefit GRSG. The current treatment rate is less than the estimated rate of encroachment.

Alternative E places more restrictions on the use of fire to treat juniper, with the intent of preserving as much sagebrush habitat as possible. Alternative E limits broadcast burning of juniper stands to 160 acres, which increases costs, reduces the number of acres that can be treated with available funds, and is less likely to reduce the rate of juniper expansion, because of the logistical challenge of limiting broadcast burning of stands to 160 acres. Overall, however, Alternative E would have approximately the same GRSG habitat improvements as Alternatives B, D, and F, all of which would improve GRSG protection compared with Alternative A.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Alternative E manages livestock grazing acreage in ways similar to Alternative A, using the terminology of Core and Low Density habitat rather than PHMA or GHMA. The same AUMs and acreage would be available for livestock grazing under Alternative E as under Alternative A. Guidance for grazing management provisions is more general under Alternative E than under Alternative D, but more specific than under Alternative B.

Fencing located near GRSG nesting areas and posing collision risk to GRSG would be marked, but not removed or modified. Structural range improvements would be located or relocated to maintain or enhance GRSG habitat quality. In addition, natural water sources that have been modified for livestock watering would be rehabilitated and off-site livestock watering facilities would be developed. Structural improvements would not be permitted within 1.2 miles of

leks in order to minimize impacts on GRSG from West Nile virus, and limit habitat degradation from concentrated numbers of livestock or wild horses in watering areas.

Impacts from Wild Horses and Burro Management

Impacts from wild horse and burro management are similar to under Alternative A. If range improvements such as water sources are retained in GRSG habitat to benefit wild horses and burros, this would reduce beneficial impacts on GRSG.

The expected outcomes for GRSG habitat from grazing management would be very similar to Alternative D, although no priorities are established for conducting assessments, slightly decreasing the likelihood that livestock grazing management would be adapted as needed in allotments with very old or no assessments available.

COT Report Threat—Energy and Mining

Impacts from Leasable Fluid Minerals Management

Alternative E recommends no development in Core Areas if there is GRSG habitat and with evidence of occupancy, but does not explicitly close areas to leasing or apply stipulations. However, ODFW strategy states that loss of core habitat is not mitigable; as a result, it would be closed to mining. Alternative E also recommends avoidance of mineral development in Low Density/GHMA areas. **Table 4-26**, Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative E, below shows the percentage of each GRSG population affected by closures to fluid mineral leasing under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas closed to fluid mineral leasing in Core Areas, with approximately 10 percent of Low Density habitat protected. For the Central Oregon and Baker populations less than ten percent of habitat would be protected by these measures in Core Areas and Low Density habitat.

Table 4-26
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Low Density	Core Area
Baker	0.00	2.41
Central	0.44	6.37
Northern Great Basin	4.33	32.35
Western Great Basin	13.47	29.63

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management and Locatable Mineral Entry

Impacts on GRSG from mineral materials and nonenergy leasable minerals management under Alternative E are the same as those described for Alternative B.

Alternative E contains no explicit recommendation to withdraw GRSG habitat from locatable mineral entry. However, ODFW strategy states that loss of core habitat is not mitigable; as a result, it would be closed to mining. The approach under Alternative E would be less effective because development of locatable minerals is a non-discretionary action; withdrawing lands from entry is the only way to achieve no development. As such, Alternative E would be more protective of GRSG habitat than current management but less effective than the other action alternatives. **Table 4-27**, Percent of the Populations Affected by Closures to Salable Minerals—Alternative E, shows the percentage of each GRSG sub-population affected by closures to salable mineral development under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin sub-populations would be within areas closed to salable mineral development, with less than 10 percent of the Central Oregon and Baker sub-populations protected by these measures.

Table 4-27
Percent of the Populations Affected by Closures to Salable Minerals—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Low Density	Core Area
Baker	0.00	2.38
Central	0.43	6.29
Northern Great Basin	4.48	31.93
Western Great Basin	13.36	29.25

Table 4-28, Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative E, below shows the percentage of each GRSG population affected by recommended withdrawals from locatable mineral entry under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas recommended for withdrawal from locatable mineral entry, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-28
Percent of the Populations Affected by Recommended Withdrawals from Locatable Mineral Entry—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Low Density	Core Area
Baker	0	0
Central	0.12	0.00
Northern Great Basin	3.45	4.97
Western Great Basin	34.31	31.79

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

Impacts on GRSG habitat from lands and realty management under Alternative E are the same as those described for Alternative B. **Table 4-29**, Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative E, shows the percentage of each GRSG population affected by ROW exclusion and avoidance areas, including for wind, under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within ROW exclusion areas, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-29
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance Areas—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)	
	Exclusion	Avoidance
Baker	>2	0
Northern Great Basin	35	0
Western Great Basin	31	0
Central Oregon	6	0

COT Report Threat—Recreation

Impacts from Recreation Management and Travel Management

Alternative E includes no specific recreation plan related to GRSG or their habitat. However, cross-country motorized travel would be seasonally prohibited and limited to existing routes in Core Area and Low Density habitat. Thus, this alternative would reduce impacts of recreation and travel on GRSG relative to Alternatives A, B, D, and F. **Table 4-30**, BLM-Administered Acres of PHMA and GHMA Core and Low Density Habitat and Percent of Oregon Populations within Travel Management Designations under Alternative E, shows the percentage of GRSG within the decision area affected by travel management

designations under Alternative E. While acres closed to OHV use would not change, over half of GRSG occur in either limited areas (28 percent of GRSG) or open areas (25 percent of GRSG) under this alternative.

Table 4-30
BLM-Administered Acres of PHMA and GHMA Core and Low
Density Habitat and Percent of Oregon Populations within Travel
Management Designations under Alternative E

Allocation	Core Habitat	Low Density	Percent Population Affected
Closed (existing)	48,450	70,566	0.8
Limited	4,498,590*	1,710,392	28
Open	0	1,610,288	25

*with seasonal buffers

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions

No lands in Core Area habitat would be available for disposal under Alternative E. Impacts from land tenure decisions are the same as Alternative B. **Table 4-31**, Percent of the Populations Affected by Unavailability to Land Disposals—Alternative E, shows the percentage of each GRSG population affected by unavailability to land disposal under Alternative E. Approximately one-third of the Northern Great Basin and Western Great Basin populations would be within areas unavailable to land disposals, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-31
Percent of the Populations Affected by Unavailability to Land
Disposals—Alternative E

Population	Percent of Population Affected (based on acres of habitat affected)
Baker	>2
Northern Great Basin	35
Western Great Basin	31
Central Oregon	6

Impacts from ACECs

No additional ACECs would be designated under Alternative E; impacts on GRSG would be the same as under Alternative A.

Summary

Alternative E uses habitat designations of Low Density instead of GHMA, and Core Area rather than PHMA. Management of Core Area habitat would be similar to PHMA; Low Density would cover fewer acres than GHMA and thus would provide less protection than Alternative B. Alternative E includes a zero percent maximum surface disturbance limit for human disturbance in Core Area habitat. Impacts from Alternative E are similar to Alternatives B, D, and F, for control of invasive plants and conifers, recreation, infrastructure, land tenure, and fire management. Grazing impacts would be similar to Alternative A, with the same acreage open to grazing, but restrictions on structural range improvements and fence marking would benefit GRSG. Alternative E has weaker restrictions on mineral leasing on BLM-administered land than other action alternatives. Overall, Alternative E is more protective of GRSG and their habitat than Alternatives A or C, but less protective than the other action alternatives. Alternative E places strict limits on the ability to treat juniper; thus is also likely to fail to treat juniper at its rate of expansion. This would reduce GRSG habitat availability, although at a slower rate than under Alternative C.

4.3.9 Alternative F

Management under Alternative F would be largely similar to that described for Alternative B, though with more stringent guidance and restrictive management in sagebrush ecosystems. PHMA and GHMA would be designated (**Table 4-2**). A maximum 3 percent disturbance cap would be applied to human disturbances in PHMA, similar to Alternatives B and D, but under Alternative F the cap would also include acreage impacted from fire under the 3 percent limit.

COT Report Threat—Fire*Impacts from Wildland Fire Management*

Under Alternative F, impacts from wildland fire management are the same as those described for Alternative B.

COT Report Threat—Invasive Plant Species*Impacts from Vegetation Management*

This alternative has no specific objective for treating invasive plant species. It requires the use of integrated vegetation management and ecologically based invasive plant management principles. It requires soil cover and native herbaceous plant populations at full ecological site potential to maximize resistance to invasion. Effects would be similar to Alternative A.

Impacts on GRSG habitat from vegetation management for invasive plants under Alternative F are the same as under Alternative B. Targets for restoration are not specified, increasing uncertainty of achieving desired outcomes. Overall, the guidance regarding invasive plant control targets is more specific than in older

plans, but less specific than in newer plans, increasing likelihood of differing interpretations across administrative units over time.

For Alternative F, the habitat trend from VDDT vegetation modeling (**Tables 4-3 and 4-4**) is upward through year 10 then downward through year 50 for sub-populations 902 and 903. The habitat trend is upward through year 50 for sub-populations 904, 906, and P04, with a higher rate of increase in the first 10 years and the greatest change for sub-population P04 (more than 10 percent). Overall habitat trend is upward through year 50 with greatest increase in first 10 years. Reducing the probability of unmanaged grazing by 50 percent under Alternative F had no effect on habitat trends. Reducing the probability of fire by 50 percent in the Warm-Dry Sagebrush Group in Alternatives B, D, E, and F to account for fuel breaks had no effect on habitat trends.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Impacts on GRSG habitat from vegetation management for conifer encroachment under Alternative F would be the same as under Alternative C.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Under Alternative F, 25 percent of livestock grazing acreage in PHMA and GHMA would be unavailable to grazing each year, and use levels in open areas would be limited to 25 percent, reducing available AUMs by approximately 62 percent. Other provisions would be the same as under Alternative B. As under Alternative B, range management structures, fences, and water features would be designed to minimize impacts on GRSG. The reduction in grazing levels is intended to reduce the impacts of livestock grazing on GRSG and their habitat, as described in **Section 4.3.2**. Reducing levels of grazing could decrease disturbance to nesting GRSG and reduce loss of sagebrush understory vegetation.

Reducing rather than eliminating grazing, as under Alternative C, would avoid an increased need for fencing, which can harm GRSG and fragment habitat. Habitat quality and acres of sagebrush habitat could increase in areas where livestock was a factor for habitat degradation. Alternative F's approach of reducing grazing could limit the loss of understory vegetation for GRSG nesting, while maintaining the range benefits provided by livestock grazing, and may lead to improved sagebrush habitat quality. However, as shown in **Tables 4-3 and 4-4**, VDDT modeling suggests the grazing reduction under Alternative F does not increase the percentage of GRSG habitat in preferred condition.

Impacts from Wild Horse and Burro Management

Under Alternative F, wild horse and burro AML would be cut 25 percent to reduce impacts on GRSG habitat. Alternative F is more restrictive of wild horse and burro use than Alternatives A, B, C, D, and E.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Impacts on GRSG from leasable minerals management under Alternative F are the same as those described for Alternative C, and the percentage of each population affected by these decisions would be the same as described for Alternative C. This alternative would also avoid leasing PHMA by closing it to new mineral leases or exploration permits, as under Alternatives B and C. For existing leases, RDFs would avoid or minimize impacts in existing leases in PHMA to the extent the law allows.

Impacts from Mineral Materials (Salables) and Locatable Mineral Entry

Impacts on GRSG from salable and locatable minerals management under Alternative F would be the same as those described for Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

Impacts on GRSG habitat from lands and realty and travel management under Alternative F are the same as those described for Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

COT Report Threat—Recreation

Impacts from Recreation Management and Travel Management

Impacts from recreation management and travel under Alternative F are the same as Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development

Impacts from Land Tenure Decisions

No lands in PHMA would be available for disposal under Alternative F. Impacts from land tenure decisions are the same as Alternative B, and the percentage of each population affected by these decisions would be the same as described for Alternative B.

Impacts from ACECs

Under Alternative F, 2,760,783 acres of GHMA and 1,492,804 acres of GHMA would be designated as new ACECs. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in the specific location and would be more likely to protect intact GRSG habitats or populations than under Alternative A.

Summary

Alternative F would apply many of the same provisions of Alternatives B, D, and E for control of invasive plant species and conifers, recreation, land tenure, and fire suppression. Alternative F would restrict surface disturbance to 3 percent in PHMA from all human disturbances, including fire. In addition, it would reduce, rather than eliminate, grazing in GRSG habitat. Alternative F would restrict mineral leasing over all occupied habitat, and would establish new ACECs for GRSG, similar to Alternative C. Reducing rather than eliminating grazing could avoid the counterproductive side effects under Alternative C, and may lead to improved sagebrush habitat quality or understory vegetation. Alternative F's approach of reducing livestock grazing could limit the loss of herbaceous understory vegetation for GRSG nesting without losing the range benefits provided by livestock grazing. However, VDDT modeling does not indicate an improvement in preferred habitat condition under this alternative.

Alternative F would place the greatest restrictions on development, but would reduce BLM management flexibility to address threats to GRSG habitat, and could result in development being pushed onto private lands lacking BLM land use controls. Overall, Alternative F would provide approximately the same level of protection as Alternative B, be more protective of GRSG than Alternatives A, C, or E, but ultimately less protective than Alternative D because of its lack of management flexibility.

4.3.10 Proposed Plan

Under the Proposed Plan, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. Management and impacts would be similar to Alternative D, though the Proposed Plan would incorporate more flexibility. This is because it calls for the use of active management tools, monitoring and mitigation, and adaptive management applied to resource uses to account for sub-regional conditions.

PHMA and GHMA would be designated (**Table 4-2**). The Proposed Plan would also include a 3 percent cap on human disturbance in PHMA and GHMA, which would additionally be mitigated to ensure a net conservation gain to GRSG. This would reduce the likelihood for habitat loss, degradation, or fragmentation.

COT Report Threat—Fire

Impacts from Wildland Fire Management

The Proposed Plan would manage wildland fire similarly to Alternative D. Recommendations from the BLM FIAT report would direct field offices to prioritize landscapes for fire prevention and fuels management within GRSG habitat to minimize the risk of wildfire in PHMA. The use of prescribed fire in GRSG habitat would be avoided unless evaluation of site-specific conditions showed a net benefit to GRSG. The Proposed Plan also establishes objectives that would provide a quantifiable indication of progress. It includes fuel breaks as part of the overall approach of managing fuel continuity across landscapes.

The Proposed Plan provides more explicit guidance for fire suppression policies. This provision would be more protective for areas governed by older plans than Alternative A and would provide a similar level of threat reduction as Alternative D.

Additional management flexibility and guidance would be incorporated to tailor management for specific vegetation communities. Fuels treatment would be designed and implemented with seasonal restrictions on treatments within winter range. Fire suppression in sagebrush areas would protect mature sagebrush and GRSG from wildfire. Post-burn restoration, such as seeding perennial grasses, forbs, and shrubs, would improve recovery rates of habitat compared with Alternative A.

COT Report Threat—Invasive Plant Species

Impacts from Vegetation Management

A different type of VDDT analysis was conducted after the DEIS, intended as an aid to developing vegetation management objectives for the Proposed Plan. The purpose of the second analysis was to identify the level of treatment needed to have 70 percent of the GRSG range provide suitable habitat at the end of 50 years.

To better integrate across administrative boundaries in the Great Basin, the BLM used information that was common to all states (Oregon, Idaho, southwest Montana, western Utah, Nevada, and northeast California). The most recent LANDFIRE vegetation data set was used to derive existing conditions, but there were significant differences between the LANDFIRE data and the ILAP data set that the Oregon BLM provided for the original analysis. This second analysis also encompassed a larger area, although areas mapped as nonhabitat in the LANDFIRE data set were not included.

Additional treatments in the second analysis included fuel breaks and assumptions concerning the effectiveness of fuel breaks in reducing wildfire size. After reviewing the results of this second analysis, the BLM determined that the results did not align with known problems in several locations, nor did they align

with the restoration priorities identified by the regional-level Great Basin Fire and Invasives Assessment Team. However, the primary vegetation management concern remained the same between the original analysis and the second analysis: While the BLM could effectively reduce the threat posed by encroaching conifers, they could not effectively reduce the threat posed by invasive annual grasses.

The intended goal of 70 percent of the GRSG range providing effective habitat at year 50 was met; habitat availability was declining and would have dropped below the goal shortly after year 50. Therefore, the BLM did not use the VDDT results in developing the vegetation management objectives in the Proposed Plan.

Impacts from habitat restoration and vegetation management on GRSG under the Proposed Plan would be similar to Alternative D. Management would also prioritize restoration projects and would use the most current science when implementing restoration. The Proposed Plan provides additional guidance for invasive plant treatments and measures to incorporate invasive plant prevention during wildfire response.

The objective of Proposed Plan management is to reduce the area dominated by invasive annual grasses to no more than 5 percent of the area (2.5 square miles, or 1,600 acres) within 4 miles of leks over the next 20 years. The objective includes managing vegetation to increase resistance to invasion where annual grasses dominate less than 5 percent of the area.

The Proposed Plan recommends testing new potential restoration methods in areas with a sagebrush overstory and annual grass understory. It establishes priority areas for treatment, lists allowable control methods, and requires actions during land management activities and wildfire response. These are intended to reduce the risk of additional spread and new invasions. It requires integrated vegetation management and ecologically based invasive plant management principles.

The estimated successful treatment rate would be approximately 12,700 acres of invasive annual grasses per year to meet its stated objective. The ability to successfully treat at such a high rate is uncertain, given the current estimated success rates for treating annual grasses in the western United States. Access to a broader array of herbicides should increase treatment success rates in Oregon; these rates have been lower than average, due to injunctions against herbicide use.

Some of the areas included within 4 miles of leks have very large annual grass infestations. Invasive plant species' spread may continue at current rates outside of the 4-mile radius. This is because other invasive plant species are not targeted, annual grass infestations are not outside of the 4-mile radius, and

funding for invasive plant treatment is limited. Use of bio-controls and targeted grazing outside of the 4-mile radius would most likely continue.

Overall, the risk of invasive plant spread is similar across the action alternatives and would contribute to reducing threats of habitat loss, fragmentation, and degradation from invasive plants, though the current management (Alternative A) approach to addressing these threats is similar.

COT Report Threat—Conifer Expansion

Impacts from Vegetation Management

Habitat restoration and vegetation management under the Proposed Plan is similar to Alternatives B and D. It contains clear priorities for juniper treatment to reduce disturbance to GRSG and loss of sagebrush or sagebrush understory vegetation. This guidance would improve the likelihood for successful sagebrush restoration and GRSG habitat enhancement over the long term, compared with Alternative A.

Under the Proposed Plan, the objective is to remove all juniper within 1 mile of leks and to reduce juniper cover to less than 5 percent within 4 miles of leks within 20 years. It would retain all old growth juniper stands and individual old trees, regardless of location. The treatment rate is estimated at approximately 5,000 acres per year within 1 mile of leks and 40,250 acres per year within 4 miles of leks, for a treatment rate of approximately 5 percent per year. The Proposed Plan provides direction on post-treatment seeding, allowable post-treatment juniper condition, and timing of prescribed burning when jackpot burning juniper.

Treatments under the Proposed Plan are focused on leks and on GRSG habitat. No treatments are directed at habitat between leks that are outside the 4-mile radius. The treatment rate would slightly exceed the most recent estimate of encroachment rate (4.5 percent) within 4 miles of leks, but encroachment could continue outside of that radius.

COT Report Threat—Grazing and Free-Roaming Wild Horses and Burros

Impacts from Range Management

Under the Proposed Plan, there would be a small decrease in the available AUMs and acreage open for livestock grazing, compared with Alternatives A and B. More specific guidance to achieve measurable GRSG habitat objectives is provided concerning livestock grazing management. It would increase the probability of more consistent approaches to livestock grazing management to support GRSG habitat and would reduce degradation and loss of understory vegetation. In addition, enhanced monitoring under the Proposed Plan would help maintain rangeland health by overseeing the implementation and effectiveness of habitat improvement.

In SFA, grazing permits would be prioritized for review in GRSG habitat. Adhering to GRSG habitat objectives in permit renewals would ensure that restoration would improve nesting and wintering habitat for GRSG.

In addition, the BLM would prioritize allotments for processing livestock grazing permits and leases and would prioritize land health assessments based on the type of allotment and time since the last assessment. This would increase the probability that problem areas would be identified and corrected.

Range management structures and water sources would be avoided in GRSG habitat where possible. Where avoidance is not possible, they would be designed to minimize West Nile virus and other harmful impacts on GRSG. As a result, livestock grazing management under the Proposed Plan would enhance GRSG habitat quality and would reduce disturbance to GRSG more than under Alternative A.

Impacts from Wild Horse and Burro Management

The Proposed Plan's impacts from wild horse and burro management are similar to those described for Alternatives B and D. The Proposed Plan also provides enhanced monitoring of rangeland health and restoration and guidance for prioritizing land health evaluations, which would improve the efficiency and response time to improve GRSG habitat conditions.

COT Report Threat—Energy Development and Mining

Impacts from Leasable Fluid Minerals Management

Under the Proposed Plan, acres closed to fluid mineral leasing in PHMA and GHMA would be the same as Alternative A (see **Table 2-11**). However, acreage subject to major stipulations (NSO) would apply to all PHMA, an increase in protection relative to Alternative A.

In SFA, NSO stipulations would apply without waiver, modification, or exception. In addition, operational constraints would be applied to existing leases for oil, gas, and geothermal energy, and mitigation measures would apply for any harm to GRSG PHMA.

RDFs would avoid or minimize impacts on PHMA to the extent the law allows, and human disturbance would be limited to 3 percent in PHMA. **Table 4-32** below shows the percentage of each GRSG population affected by closures to fluid minerals under the Proposed Plan. Approximately one-third of the Western Great Basin population would be within areas closed to fluid mineral leasing. Over 10 percent of the Northern Great Basin population and one percent or less of the Central Oregon and Baker populations would be protected by these measures.

Table 4-32
Percent of GRSG Populations Affected by Closures to Fluid Minerals—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)	
	GHMA	PHMA
Baker	0.00	0.00
Central	1.82	0.32
Northern Great Basin	13.19	13.66
Western Great Basin	31.34	26.39

These provisions would reduce the impacts of fluid mineral leasing and development on GRSG habitat loss, degradation, and fragmentation more than Alternative A.

Impacts from Mineral Materials (Salables), Nonenergy Leasable Minerals Management, and Locatable Mineral Entry

Under the Proposed Plan, PHMA would be closed to new salable mineral material site development and nonenergy leasable minerals. This would reduce impacts on GRSG habitat, though it could push development onto private lands, which are not subject to the 3 percent disturbance cap or other land use controls.

Table 4-33 below shows the percentage of each GRSG population affected by closures to salable minerals under the Proposed Plan. Approximately one-third of PHMA in the Northern Great Basin and Western Great Basin populations would be within areas closed to salable mineral development, with less than 10 percent of the Central Oregon and Baker populations protected by these measures.

Table 4-33
Percent of the Populations Affected by Closures to Salable Minerals—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)	
	GHMA	PHMA
Baker	0.00	2.37
Central	0.93	6.26
Northern Great Basin	6.65	31.83
Western Great Basin	15.05	29.85

The Proposed Plan recommends withdrawal from locatable mineral entry under the General Mining Act in SFA, which could decrease fragmentation and surface disturbance to GRSG habitat compared with Alternative A.

Prospecting for nonenergy leasable minerals would be permitted after appropriate environmental review. However, this alternative would minimize habitat loss and other impacts from locatable mineral development in PHMA by limiting surface disturbance to 3 percent.

COT Report Threat—Infrastructure

Impacts from Lands and Realty Management

PHMA would be managed as ROW avoidance areas (4,229,620 acres), and ROW exclusion areas would be established for wind and solar energy outside of the three southeast Oregon counties (**Table 2-10**). ROWs would be allowed in avoidance areas if the disturbance would be under the 3 percent disturbance cap and would result in a net conservation gain. ROW authorization would include evaluation and implementation of effective mitigation to offset any resulting loss of GRSG habitat. The threat to GRSG from avian predators would be reduced through the RDF requiring perch deterrents on all power lines.

In GHMA, the actions described under the Proposed Plan would consider ROW authorization on a case-by-case basis, with assessments to determine impacts on GRSG habitat and connectivity. Locations outside PHMA would be prioritized when possible.

The Proposed Plan would eliminate such impacts as habitat fragmentation and increased predation from solar and wind energy development in PHMA outside the three southeastern counties. It would reduce impacts in the rest of PHMA and all of GHMA. In split-estate, potential relocation of development onto adjacent private lands could occur.

Table 4-34 shows the percentage of each GRSG population affected by ROW exclusion and avoidance, including wind power, under the Proposed Plan. Close to 5 percent of the Western Great Basin would be in ROW exclusion areas, along with less than one percent of the other population areas. Close to 40 percent of the Northern Great Basin and Western Great Basin populations would be within ROW avoidance areas, with over 15 percent of the Central Oregon and one percent of the Baker populations protected by these measures.

Table 4-34
Percent of GRSG Populations Affected by ROW Exclusion or Avoidance
Areas—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)	
	Exclusion	Avoidance
Baker	0	1.4
Northern Great Basin	0.34	39.4
Western Great Basin	4.4	36.9
Central Oregon	0.76	16.8

COT Report Threat—Recreation*Impacts from Recreation and Travel Management*

Impacts from recreation and travel management under the Proposed Plan are the same as Alternatives B and D.

COT Report Threat—Sagebrush Removal, Agricultural Expansion, and Urban Development*Impacts from Land Tenure Decisions*

No lands in PHMA would be available for disposal unless the action would result in net conservation gain to GRSG, or it would not directly or indirectly adversely impact GRSG. Impacts from land tenure decisions are the same as those under Alternatives B and D.

Table 4-35 shows the percentage of each GRSG population affected by unavailability to land disposal. Approximately 10 percent of the Northern Great Basin, Central Oregon, and Western Great Basin populations would be within areas unavailable to land disposals, with only 2 percent of the Baker population protected by these measures.

Table 4-35
Percent of the Populations Affected by Unavailability to Land Disposals—Proposed Plan

Population	Percent of Population Affected (Based on Acres of Habitat Affected)
Baker	2.5
Northern Great Basin	13.2
Western Great Basin	9.9
Central Oregon	10.4

Impacts from ACECs

No additional ACECs would be designated under the Proposed Plan; impacts on GRSG would be the same as under Alternative A.

Summary

The Proposed Plan uses flexibility in applying development restrictions in GRSG habitat. It would use ROW avoidance but not exclusion areas, up to an allowable disturbance cap of 3 percent human disturbance, not including from fire. Less GRSG habitat would be closed to mineral development than under Alternatives B or C, but the Proposed Plan applies protective stipulations and buffers and requires mitigation for any damage to GRSG habitat.

In addition, the 3 percent disturbance cap in PHMA would limit the extent of damage to important GRSG habitat. The use of adaptive management and

monitoring would allow the BLM to evaluate population response and improve its management of habitat over time. These protective measures would reduce the spread of new power lines, energy development, mines, and roads in GRSG habitat and would reduce the associated threat from predators, particularly ravens. The Proposed Plan provides a more targeted approach to prioritizing GRSG habitat areas, compared with the other action alternatives. The flexibility of Alternative D allows management to adapt to regional conditions and would provide the highest level of protection for GRSG habitat of all the action alternatives.

4.3.11 Summary

Fire

For fire, Federal Wildland Fire Management Policy applies under all alternatives. The purpose of wildfire response is to support attainment of applicable land use plan goals and objectives, one of which is to restore fire as an ecosystem process. Ultimately, there is little effective difference among the alternatives for fire suppression priorities. Although the wording is different, intent of all alternatives is to protect breeding and wintering habitat for GRSG. The primary difference is in fire management direction in the less than 12-inch precipitation zone (Warm-Dry and Shallow-Dry Sagebrush Groups, predominantly); in Oregon, there is a high degree of overlap between these two habitat types.

Alternatives B, C, and F do not address fuel homogeneity. Homogeneous fuel beds typically produce homogeneous burn patterns and result in invasive plant issues considered adverse for GRSG habitat quality and quantity. Post-fire seeding success rates are generally very low in the less than 12-inch precipitation zone.

Alternative D or the Proposed Plan are most likely to reduce fire risks since the widest range of techniques is allowed and the use of unplanned fire to meet habitat objectives is explicitly permitted. However, these alternatives still carry a risk of unfavorable outcomes, since treatment efficacy has not been established and it is unclear if treatment rates will be sufficient. Alternative E is more likely to be effective than Alternatives B, C, or F since it does allow for treating sagebrush to create mosaics, but its approach is generally more cautious than under Alternative D or the Proposed Plan.

Alternative A has similar probable outcomes but the lack of clear desired conditions under A allows for potentially less effective management to guide use of fire and fuels management for sagebrush-steppe restoration.

Invasive Plants

For treatment of invasive plant species under the existing management approach, BLM's Integrated Vegetation Management Handbook (H-1740-2) includes BMPs for limiting the spread of invasive plant species during any ground-disturbing activity, which includes construction projects within or

adjacent to sagebrush habitats. In addition, Federal Wildland Fire Management Policy requires wildfire responses support attainment of applicable land management objectives, including protection of habitat values, and BLM's Burned Area Emergency Stabilization and Rehabilitation Handbook (H-1742-1) stipulates monitoring for 3 years post-treatment to prevent establishment of invasive plants. Reclamation is also required post-mining, under BLM's Planning for Fluid Mineral Resources Handbook H-1624-1 (leasable minerals), Mineral Materials Disposal Handbook H-3600-1 (salable minerals), Surface Management Handbook H-3809-1 (locatable minerals), and 43 CFR 3100, 3200, 3600, and 3800.

Most COT report recommendations for invasive plants do not require a LUP decision to implement; exceptions include limiting OHV use to existing routes, limiting allowable stocking levels and utilization levels for grazing, setting surface occupancy limitations for mining, and restricting the locations of new infrastructure. However, in the absence of any vegetation treatment, habitat trend is downward for all populations, largely due to expansion of annual grass at approximately 0.1 percent per year.

Thus, the alternatives would have a small impact on vegetation management. The Northern Great Basin population would remain stable or would slightly increase for the first 10 years under all alternatives. After 50 years, the percentage of habitat in preferred condition would be stable under Alternatives A, B, E, and F; it would be down under Alternative C and up under Alternative D. Of the six alternatives analyzed, Alternative D would be most beneficial to GRSG habitat for this population.

For the Western Great Basin population, after 10 years the percentage of GRSG habitat in preferred condition would remain stable or would increase under all alternatives. After 50 years, the results would differ between analysis areas for this population. The larger area (903) would see a drop in habitat percentage in preferred condition under Alternatives A, C, D, and E, and habitat percentage would be stable under Alternatives B and F; the smaller area (906) would increase the percentage of habitat in preferred condition under all alternatives, with the largest increase under Alternative D (from 30 percent to 43 percent).

The Central Oregon population would have a stable percentage of habitat in preferred condition under all alternatives and an increase after 50 years, the largest increase of which would be under Alternative D. Overall, the largest improvements would occur under Alternatives B, E, and F after 10 years and under Alternatives D and F after 50 years.

The area with 10 to 30 percent sagebrush cover would differ by alternative; for various subpopulations it would be between 7 and 10 percent over 50 years, at a 1 percent treatment rate (**Tables 4-3 and 4-4**). Alternative C may be

counterproductive by increasing the probability of invasive plant spread, because of its focus on passive management to restore sagebrush-steppe.

For the Proposed Plan, the BLM conducted a different type of VDDT analysis with results not comparable to the results in **Tables 4-3** and **4-4**. This second analysis was to identify treatment rates needed to provide adequate GRSG habitat over 70 percent of the area capable of providing habitat. It also used common data layers across the entire Great Basin, resulting in significant differences in how the existing vegetation was characterized, compared with the previous VDDT analysis, and for all other purposes in this analysis. While that run was able to meet the stated goal, habitat was still declining across the entire planning area, largely due to continued expansion of annual grasses.

Conifer Expansion

For conifers, the existing Standards for Rangeland Health promote the development of healthy rangeland ecosystems with characteristic plant community types and species compositions, and juniper encroachment into sagebrush-steppe is considered undesirable. Treatment of juniper encroachment generally has a high success rate, although at the present time it is not possible to establish whether sagebrush-steppe response is adequate.

Alternatives A, B, D, and F and the Proposed Plan are very similar with respect to conifer encroachment, with the clearest treatment priorities under Alternative D and the Proposed Plan, which identify Restoration Opportunity Areas as key location for restoration projects and provide subsequent criteria for conifer removal. Whether these alternatives would treat at an adequate rate to maintain existing GRSG habitat would depend on funding.

Alternative C, with its focus on passive restoration, could be counterproductive, resulting in an increase in juniper extent over time, and reducing GRSG habitat availability, especially in late brood-rearing habitat. Alternative E places strict limits on the ability to treat juniper and thus is also likely to result in failure to treat juniper at its rate of expansion, resulting in a reduction in GRSG habitat availability, although at a slower rate than under Alternative C.

Grazing and Range Management

For grazing and range management, management guidance vary in specificity in older land management plans; however, Standards for Rangeland Health and Guidelines for Grazing Management apply. The standards and guidelines require periodic assessments of range conditions and adjustments to grazing practices to improve ecosystem function. Allowable utilization can be adjusted during permit renewals to account for the current conditions. Newer plans often have some guidance related to drought, and IM 2013-094 provides detailed procedures for adjusting grazing during drought that apply to all plans.

Grazing is widespread across GRSG habitat and its impacts of grazing on GRSG are debated, but research suggests that grazing up to moderate levels can co-

exist with GRSG habitat and may support range health by reducing dead fuel buildup in grass crowns, limiting bunchgrass mortality during fires and helping to maintain healthy bunchgrass plants and allow for seed production.

Alternatives A and B have the lowest probability of adjusting grazing management to meet GRSG habitat needs. This is due to the lack of direction, to specific, measurable habitat objectives in the older plans under Alternative A, and to the unclear management direction under Alternative B. Grazing restrictions under Alternative C could be counterproductive and would decrease GRSG habitat quality and quantity over time. Alternative E is less likely to adjust grazing management to meet GRSG habitat needs, largely because assessments are not prioritized. Alternative D and the Proposed Plan provide the clearest direction with the highest likelihood of adjusting grazing management to meet GRSG habitat needs. Alternative F would restrict livestock and wild horse and burro grazing less than would Alternative C, so it may achieve some improvement in habitat quality. Currently the BLM does not gather wild horses, so management at AML is unlikely. This would reduce the likelihood of GRSG habitat improvements from restricting wild horses and burros.

Energy Development and Mining

For energy development and mining, the most definitive way to avoid new mining activities and associated infrastructure in GRSG habitat is to close the habitat to mineral development or withdraw it from mineral entry, in the case of locatable minerals.

For leasable and salable minerals, Alternatives B, C, and F would close all PHMA to new mineral leases. With Alternative E, new leases in suitable GRSG habitat within Core Area habitat would be avoided. Leasing in GRSG habitat would not be avoided in Alternative A. While Alternative D and the proposed Plan also would not close GRSG habitat to leasing but new leases would be subject to NSO or CSU stipulations and a total surface disturbance cap of 3 percent would be applied. Disturbed areas would be restored to habitats used by GRSG before additional disturbance would be allowed. While stipulations would be available to the BLM in Alternatives B, C, D, F, and the Proposed Plan, they can be imposed with leased fluid minerals only to the extent allowed by law. Thus, the alternatives that close GRSG to new leases (Alternatives B, C, and F) provide a greater degree of habitat protection on BLM-administered land, but may push development onto private lands that lack BLM land use controls.

For locatable minerals, Alternatives C and F would petition to withdraw the largest amount of GRSG habitat (all occupied habitat) from locatable minerals. Alternative B would withdraw only PHMA, which includes 95 percent of known occupied habitat in Oregon. Alternative E would not recommend withdrawing habitat, but states that no development in Core Areas would occur if there is evidence of GRSG use. Alternatives A and D do not recommend to withdraw

habitat from mineral entry. However, a 3 percent surface disturbance threshold in Alternative D and the Proposed Plan could preclude levels of development reported to cause range abandonment (Knick et al. 2013), because disturbance from locatable mineral entry would count towards the 3 percent disturbance cap. Further impact avoidance may occur if the operator agrees to implement BMPs (under the Proposed Plan).

All of the action alternatives, except Alternative E, have the same RDFs and BMPs. These RDFs and conservation measures include such requirements (to the extent allowed by law) as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

In addition, under all alternatives, reclamation bonds are required (pursuant to 43 15 CFR, Part 3104), with amount of the bond required to be sufficient to ensure full restoration of lands. The objective is to restore disturbed areas to the pre-disturbance landforms and desired plant community that will meet sage-grouse habitat needs (Pyke 2011), though these objectives are not always achieved. Reclamation objectives for PHMA and GHMA in the RDFs apply to Alternatives B, C, D, F and the Proposed Plan. Reclamation of abandoned mine lands to healthy sagebrush ecosystems would occur consistent with priority objectives for GRSG habitat restoration and vegetation management.

Overall, Alternatives A, D, and E are less effective in avoiding new mining activities and/or any associated facilities within occupied habitats, because they rely on discretionary actions by BLM and/or mining operators, while Alternatives C and F would be more effective at protecting GRSG habitat on BLM-administered land from mining activities. However, Alternatives B, D, F and the Proposed Plan would adhere to a 3 percent disturbance cap to limit damage to GRSG habitat.

Infrastructure

For lands and realty, Alternative A would allow development in existing corridors, which have been established in location to minimize impacts on wildlife habitat. Alternatives B, C, E, and F would establish ROW exclusion areas in PHMA and avoidance areas in GHMA. Alternative D and the Proposed Plan would avoid ROWs in PHMA, and on a case-by-case basis in GHMA, but would not establish exclusion areas. Exclusion areas may be ineffective, because existing infrastructure corridors have been sited in locations that minimize impacts, and relocation could push ROW development onto adjacent private land with fewer land use restrictions. Thus, the flexible approach under Alternative D and the Proposed Plan would be most effective in protecting GRSG habitat.

Recreation, including Travel

Most recreational activity in GRSG habitat is benign, with the exception of off-road vehicle use. Issuance of SRPs would be restricted under Alternatives B, D, F, and the Proposed Plan but dispersed recreational activity does not require a permit and would not be impacted.

For road closures, Alternatives A, B, D, F and the Proposed Plan do not seasonally close roads in GRSG habitat. Alternative C closes roads seasonally in habitat areas and limits OHVs to existing routes and Alternative E also provides for seasonal closures during nesting season. Alternatives B and D and the Proposed Plan also limit OHVs to existing routes in PHMA. Alternatives C and E are most protective of GRSG from road impacts.

Land Tenure

All alternatives would be effective in retaining lands from disposal. Alternative A does not specify retention of GRSG habitat, but has a similar objective to retain land with wildlife habitat value. Alternative E retains Alternative A's approach. Alternatives B, C, D, F and the Proposed Plan would avoid disposal of GHMA/Core Area habitat lands, but Alternative C would also retain GHMA, protecting the largest acreage of GRSG habitat from exchange or disposal.

Alternatives C and F are the only alternatives to establish new ACECs for GRSG. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in the specific location and would be more likely to protect intact GRSG habitats or populations than alternatives lacking new ACECs.

Comparison of Alternatives Alleviation of USFWS-Identified Threats

Approaches to GRSG management and alleviation of the USFWS-identified threats to GRSG vary by alternative. **Table 4-36**, Comparison of Alleviated Threats to GRSG by Alternative, summarizes and cross references specific management by the applicable BLM resource programs under each alternative with the threat.

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
COT Report Threat—Fire							
<i>Fire and Fuels</i>							
Fire and fuels management	Current management allows fuels treatments in sagebrush and promotes developing fuel breaks.	In PHMA, implement fuels treatments that protect sagebrush, maintaining canopy cover and restricting fuels treatments.	Same as Alternative A	Develop fuel breaks to protect larger intact blocks of habitat. Treat 3 percent of GRSG habitat per year for 10 years to reduce the probability of homogeneous burn patterns.	Prevent fire from entering at-risk communities (e.g., cheatgrass)	Same as Alternative B	Same as Alternative D
<i>Wildfire</i>							
Fire operations	No similar action.	In PHMA, prioritize suppression in GRSG habitat immediately after life and property.	Same as Alternative A.	Same as Alternative B.	Give wildfire suppression priority to known GRSG habitat within the framework of the Federal Wildland Fire Policy	Same as Alternative B.	Same as Alternative B
Summary of Impacts on GRSG from Fire	For fire management, Alternatives B, C, and F would produce homogeneous fuel beds that could result in invasive plant issues post-burn. Alternative D or the Proposed Plan is most likely to reduce fire risks since the widest range of techniques is allowed and the use of unplanned fire to meet habitat objectives is explicitly permitted. Alternative E is more likely to be effective than Alternatives B, C, or F because it allows for treating sagebrush to create mosaics, but its approach is more limited than Alternative D or the Proposed Plan. The lack of clear desired conditions under A allows for less effective management of fire and fuels management for sagebrush-steppe restoration.						

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
COT Report Threat—Energy Development and Mining							
<i>Unleased Fluid Minerals</i>							
Areas closed to fluid mineral leasing (federal)	3,073,567	6,327,708	10,167,888	Same as Alternative A	Same as Alternative B	Same as Alternative C	Same as Alternative A
Areas open to mineral leasing with NSO stipulation	860,003	586,757	187,825	3,413,017	Same as Alternative B	Same as Alternative C	3,867,197
Open to fluid mineral leasing, total acres (federal)	3,830,575	2,633,287	899,375	Same as Alternative A	Same as Alternative B	Same as Alternative C	Same as Alternative C
<i>Mining</i>							
Locatable minerals—recommended for withdrawal	24,443	4,118,660	8,876,177	Same as Alternative A	Same as Alternative B unless nonhabitat	Same as Alternative B	1,816,802
Open for consideration for mineral materials disposal and salable minerals	8,857,980	5,624,414	1,824,289	Same as Alternative B	Same as Alternative B	Same as Alternative B	5,592,976

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Summary of Impacts on GRSG from Energy Development and Mining	For leasable and salable minerals, Alternatives B, C, and F would close all PHMA to new mineral leases, or Alternative E within Core Area habitat. Leasing in GRSG habitat would not be avoided under Alternative A. While Alternative D and the Proposed Plan also would not avoid leasing in GRSG habitat, new leases would be subject to NSO or CSU stipulations and a 3 percent maximum disturbance cap in PHMA. (Alternatives B and F also include a 3 percent disturbance cap, while Alternative C includes a 0 percent disturbance cap in PHMA.) While stipulations would be available to the BLM in Alternatives B, C, D, and F and the Proposed Plan, they could be imposed with leased fluid minerals only to the extent allowed by law. Thus, the alternatives that close GRSG to new leases (Alts. B, C, and F) provide a greater degree of habitat protection for federal lands. For locatable minerals, Alternatives C and F would recommend to withdraw the largest amount of GRSG habitat from locatable minerals. Alternative B would withdraw only PHMA, 95 percent of known occupied habitat in Oregon. Alternative E would not propose to withdraw habitat. Alternatives A and D do not propose to withdraw habitat from mineral entry. All of the action alternatives, except Alternative E, have the same RDFs and BMPs, as allowed by current law. Overall, Alternatives A and D are the least effective in avoiding new mining activities or associated facilities within occupied habitat, because they rely primarily on discretionary actions. Alternatives C and F would be the most effective at protecting GRSG habitat from mining activities.						
COT Report Threat—Infrastructure							
ROW avoidance areas	3,445,685	6,106,923	292,671	5,964,814	1,821,721	292,671	9,914,490
ROW exclusion areas	857,564	4,866,030	10,682,124	Same as Alternative A	Same as Alternative B	Same as Alternative C	858,203
Summary of Impacts on GRSG from Infrastructure	Alternative A would allow development in existing corridors. Alternatives B, C, E, and F would establish ROW exclusion areas in PHMA and avoidance areas in GHMA. Alternative D and the Proposed Plan would avoid ROWs in PHMA but would not establish exclusion areas. A 3 percent maximum disturbance cap would apply for Alternatives B, D, and F and the Proposed Plan. Exclusion areas may be ineffective because existing infrastructure corridors have already been sited in areas of minimal impact, and exclusion could force ROWs onto private land where they could impact a larger amount of GRSG habitat.						
COT Report Threats—Grazing and Range Management							
Areas available for livestock grazing	12,271,791	Same as Alternative A	787,139	12,183,315	Same as Alternative A	7,506,632 (75 percent of Sum of PPH and PGH Open for Alternative A)	12,291,667

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Areas closed to grazing	246,609	Same as Alternative A	11,762,357	335,588	Same as Alternative A	2,502,210 (25 percent of Sum of PPH and PGH of Alternative A)	297,601
Summary of Impacts on GRSG from Grazing	Alternatives B, D, and E would maintain existing acreage open to grazing but prioritize restoration of rangeland in GRSG habitat. Alternatives C and F would reduce or eliminate grazing in GRSG habitat areas, protecting GRSG from grazing impacts but also allowing for fuels buildup. Alternatives A and B have lower probability of adjusting grazing management to meet GRSG habitat needs due to lack of specific management direction. Alternative C and F's grazing restrictions could decrease GRSG habitat quality and quantity in some areas over the long term due to fuel buildup. Alternative E is less likely to adjust grazing management to meet GRSG habitat needs, because assessments are not prioritized and specific, measurable habitat objectives are lacking. Alternative D and the Proposed Plan provide more specific direction with higher likelihood of adjusting grazing management to meet GRSG habitat needs.						
COT Report Threats—Conifer Invasion and Invasive Plants (Vegetation Management)							
Areas prioritized for vegetation treatments	Maintain and improve condition of plant communities that provide wildlife habitat, recreation, forage, scientific, scenic, ecological, and water and soil conservation benefits	Prioritize restoration projects in areas most likely to benefit GRSG	Same as Alternative A	Priority locations for restoration projects should be in the Restoration Opportunity Areas	Sagebrush conversion on BLM-administered lands (e.g., crested wheatgrass seedings) should be avoided	Same as Alternative B	Same as Alternative D
Summary of Impacts on GRSG from Vegetation Management	Under existing management, BLM's Integrated Vegetation Management Handbook (H-1740-2) includes best management practices for limiting the spread of invasive plant species during any ground-disturbing activity, which includes construction projects within or adjacent to sagebrush habitats. Most COT report recommendations for invasive plants do not require a land use plan decision to implement, and overall, it is unlikely that collective actions would have significant effect on invasive plant species spread rates. Thus, the alternatives may have little impact on vegetation management. Alternative C may be counterproductive, increasing the probability of invasive plant spread, because of its focus on passive management to restore sagebrush-steppe. Among the other alternatives, Alternative D has the most specific language, reducing potential for differing interpretations.						

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
	For conifer encroachment, existing Standards for Rangeland Health promote the development of healthy rangeland ecosystems, and juniper encroachment into sagebrush-steppe is considered undesirable. Treatment of juniper encroachment generally has a high success rate. Alternatives A, B, D, F and the Proposed Plan are similar with respect to conifer encroachment, with the clearest treatment priorities under Alternative D and the Proposed Plan. Alternative C, with its focus on passive restoration, would be ineffective. Alternative E places strict limits on the ability to treat juniper and thus would also be likely to result in failure to treat juniper at its rate of expansion.						
COT Report Threat—Recreation							
Issuance of SRPs	No action	Only SRPs in PHMA that have neutral or beneficial impacts on GRSG	Same as Alternative A	Evaluate allowances for existing SRPs with stipulations in PHMA to reduce disturbance to GRSG	Protect GRSG from disturbance through seasonal closures of roads and areas	Same as Alternative B	Same as Alternative D
Open to cross-country (off-road) motorized travel	6,811,890	4,141,539	1,202,694	Same as Alternative B	3,913,675	Same as Alternative B	Same as Alternative B
Closed to off-road motorized travel	300,328	Same as Alternative A	Same as Alternative A	Same as Alternative A	274,965	Same as Alternative A	Same as Alternative A
Acres limited—vehicle use only on existing roads and trails with possible time restrictions	5,325,377	7,996,165	10,937,171	Same as Alternative B	6,043,851	Same as Alternative B	Same as Alternative B
Summary of Impacts on GRSG from Recreation	Most recreational activity in GRSG habitat is benign, with the exception of off-road vehicle use. Issuance of SRPs would be restricted under Alternatives B, D, F, and the Proposed Plan, but dispersed recreational activity does not require a permit and would not be impacted. For road closures, Alternatives A, B, D, F and the Proposed Plan do not seasonally close roads in GRSG habitat, though they may limit use on a seasonal basis. Alternative C closes roads year-round in habitat areas, and restricts most other roads. Alternative E provides for seasonal closures during nesting season. Alternatives C and E are most protective of GRSG from recreational road impacts.						

Table 4-36
Comparison of Alleviated Threats to GRSG by Alternative

Resource and Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
COT Report Threat—Sagebrush Removal, Agricultural Conversion, and Urban Development							
Acres delineated as PPH/PHMA/Core	4,547,043	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Acres delineated as PGH/GHMA/Low Density	5,662,632	Same as Alternative A	Same as Alternative A	Same as Alternative A	3,923,539	Same as Alternative A	Same as Alternative A
Acres not available for exchange or disposal (Zone I)	9,170,893	10,220,409	11,757,136	Same as Alternative B	Same as Alternative A	Same as Alternative B	Same as Alternative B
Areas of Critical Environmental Concern	715,048	Same as Alternative A	5,063,388	Same as Alternative A	Same as Alternative A	4,755,249	Same as Alternative A
Summary of Impacts on GRSG from Agriculture and Urbanization	All action alternatives establish GRSG management areas in priority or core habitat and general or Low Density habitat. Alternative A does not specify retention of GRSG habitat, but retains land with wildlife habitat value. Alternative E retains Alternative A's approach. Alternatives B, C, D, F and the Proposed Plan would avoid disposal of PPH/Core GRSG habitat, but Alternative C would also retain GHMA, thereby protecting the largest amount of habitat from exchange or disposal. Alternatives C and F are the only alternatives to establish new ACECs for GRSG. In ACECs where GRSG is a relevant and important value, management prescriptions would be tailored to the threats to GRSG in each specific location and would be more likely to protect intact GRSG habitats or populations than alternatives lacking new ACECs.						

4.4 VEGETATION

This section is a discussion of expected impacts on untargeted vegetation and special status plants from proposed management actions and the expected impacts of vegetation management targeted at increasing habitat quality in dense sagebrush and crested wheatgrass seedings.

4.4.1 Methods and Assumptions

Indicators

Indicators of impacts on vegetation are as follows:

Untargeted Vegetation

- Risk of unintentional damage to aspen, mountain shrub, salt desert scrub, and riparian plant communities
- Potential reductions or loss of special status plant populations

Vegetation Management for Habitat Improvement

- Changes in resistance to invasion and resilience from wildfire
- Changes in species diversity and sagebrush cover in crested wheatgrass seedings

Assumptions

The analysis includes the following assumptions:

- The degree of impact attributed to any one disturbance or series of disturbances is influenced by several factors—location in the watershed; the type, time, and degree of disturbance; existing vegetation; precipitation; and mitigating actions applied to the disturbance.
- New invasions of invasive plant species would continue to occur and spread as a result of ongoing vehicle traffic in and out of the planning area, recreation, wildland fire, wildlife and livestock grazing and movements, and surface-disturbing activities. Ecological health and ecosystem functioning depend on a number of factors—vegetation cover, species diversity, nutrient cycling and availability, water infiltration and availability, percent cover of invasive plants, and climatic fluctuation.
- Pretreatment surveys for special status plants would occur before treatment and measures taken to avoid loss or damage to identified species and populations.
- Treatment blocks with logical boundaries (e.g., roads, ridges, and similar breaks in vegetation or fuels) may incorporate edges and inclusions of untargeted plant communities, such as aspen, salt desert scrub, mountain shrub, and riparian and wetland vegetation.

- Prescribed fire would be used in dense sagebrush, but the BLM would use radically different burning prescriptions compared with traditional prescriptions. For example, in sagebrush, the BLM would limit the extent of burned area.
- Treatment methods used in crested wheatgrass seedings successfully reduce crested wheatgrass and increase native plant species establishment, including sagebrush seedlings without increasing invasive plant species.
- Short-term effects on upland vegetation would occur for up to ten years, and long-term effects would occur over longer than ten years.
- Short-term effects on riparian and wetland vegetation would occur over two years or less, and long-term effects would occur over longer than two years.
- Impacts from the management of wild horses and burros, air quality, recreation, coal, and wildfire response methods do not substantially differ between all alternatives, including Alternative A, and have negligible to no impacts on untargeted vegetation and special status plants beyond what could occur under current policies and plans.
- Areas recommended for withdrawal would be withdrawn from locatable mineral development.

Because very few studies concerning the potential impacts of climate change on rangeland vegetation have occurred, the BLM conducted the analysis assuming continuation of the current climate regime.

4.4.2 Nature and Type of Effects

The potential impacts of managing juniper encroachment and invasive plant species are discussed under the relevant COT report threats in **Section 4.3**. This section examines the potential impacts of actions to restore sagebrush where the canopy cover is too low or too high to provide high quality GRSG habitat, species diversity, and sagebrush canopy cover in crested wheatgrass seedings. It also discusses the potential impacts of a variety of actions, including vegetation management, on untargeted vegetation communities (aspen, mountain shrub, salt desert scrub, and riparian vegetation) and on special status plants. The actions most likely to have undesired impacts on untargeted vegetation communities and special status plants are vegetation management of targeted communities, including fuels management and post-fire rehabilitation; livestock grazing; minerals development, primarily leasable and salable minerals; new ROW development; and travel management, primarily OHV management.

Other actions are unlikely to have measureable impacts and are not discussed further. BLM policy already requires avoiding adverse impacts on special status

plant populations and vegetation, particularly riparian vegetation, when undertaking the following actions:

- Locating and constructing new infrastructure to aid in managing wild horses and burros or livestock
- Locating temporary infrastructure for wildfire responses
- Locating and constructing recreation facilities

Wildfires have far greater impacts than the wildfire management actions taken to benefit GRSG. The potential impacts of land tenure adjustments to benefit GRSG are too speculative because they would depend on the ecological site, vegetation condition, and location of the parcel. Designating additional ACECs with GRSG habitat as an important or relevant value would not confer any additional protections; that is, not beyond what is already provided by other actions in this amendment and by BLM policies. Affected communities would be aspen, mountain shrub, salt desert scrub, and riparian vegetation and special status plants.

Vegetation Management and Habitat Restoration

High-quality GRSG habitat includes a diversity of herbaceous species, vegetation and reproductive health of native grasses, and an abundance of sagebrush across the landscape with canopy cover of 10 to 25 or 30 percent, depending on the general sagebrush community type (Manier et al. 2013). Over the long term, vegetation treatments that maintain sagebrush across the landscape in the appropriate canopy cover range and that enhance native vegetation and overall ecosystem productivity would remain resistant to annual grass invasions and resilience to stand-replacing disturbances, such as wildfires (Chambers et al. 2014a; Chambers et al. 2014b).

In addition to vegetation treatments that reduce threats to GRSG habitat, treatments that increase sagebrush canopy cover where it is too low, that reduce sagebrush canopy cover where it is too high, and that increase both sagebrush canopy cover and native herbaceous species diversity also improve the abundance and distribution of high quality GRSG habitat.

The overall goals are to maximize the extent of source habitat² and to minimize the extent of sink habitat.³ Locally and regionally, the distribution of these treatments can affect the distribution of GRSG and sagebrush habitats (Manier et al. 2013). Vegetation treatments would have short-term effects from vegetation removal and disturbance; but they would result in long-term improvements in vegetation structure, composition, and diversity and may improve communities' resilience and resistance to disturbance.

²Habitat that maintains and promotes GRGS population growth

³Habitat used by GRSG that does not maintain population growth

Sagebrush and Crested Wheatgrass Seeding Management

Some areas capable of supporting sagebrush are candidates for restoration treatments. These areas either have no sagebrush or have low canopy, or they are areas with sagebrush canopy cover that exceeds 25 percent in warm-dry sagebrush and 30 percent in cool-moist sagebrush. Where sagebrush canopy cover is low or missing, seeding and planting would increase canopy cover if the effort were successful. Where sagebrush canopy cover is too high, thinning treatments using mechanical methods, prescribed fire, or herbicides would open sagebrush canopies and enhance production in the herbaceous layer, including tall bunchgrasses and forbs important to GRSG.

Some sites may be still in the earlier stages of recovery from a stand-replacing disturbance, such as a wildfire, or earlier vegetation treatment. Natural recovery can occur as quickly as 15 years in cool-moist sagebrush or as long as 80 to 100 years in warm-dry sagebrush (Nelson et al. 2013; Evers et al. 2013; Manier et al. 2013; Schlaepfer et al. in press). Factors influencing sagebrush germination and establishment are the following (Nelson et al. 2013; Evers et al. 2013; Schlaepfer et al. in press):

- Type, amount, and timing of precipitation between late fall and spring
- Size and edge-to-interior ratio of the disturbance
- Number and distribution of surviving reproductively mature sagebrush plants
- Seed mass
- Degree of soil compaction
- Litter depth

Sagebrush establishment is episodic, with poor conditions associated with high establishment episodes (Nelson et al. 2013; Schlaepfer et al. in press). As such, identifying when seeding or planting should occur to optimize treatment success remains difficult and success rates are low. Several trials of new seeding methods are underway, with test plots established in certain areas that burned in 2012.

Thinning sagebrush has relied primarily on mechanical means in Oregon, although chemical means have been used in other states. Mechanical means use heavy equipment to create strips or blocks of treated areas where sagebrush is mowed, crushed, or otherwise substantially damaged. Sagebrush recover as long as some of the plant remains alive, but recovery can take 20 years or more, depending on the ecology of the site (Davies et al. 2009).

Impacts on herbaceous species depend on such factors as mow height, the type of equipment used, and the depth of the resulting shredded vegetation;

however, these have not been well studied. Herbicides kill varying amounts of sagebrush, depending on the particular herbicide used and the application rate (Wachocki et al. 2001; Olson and Whitson 2002; Chi 2004). Recovery rates tend to be quicker than with mechanical methods because sagebrush structure remains in the treated area. Treating sagebrush with tebuthiron in particular has few to no adverse impacts on the understory vegetation (Wachocki et al. 2001; Olson and Whitman 2002; Chi 2004).

Thinning with prescribed fire likely is possible, given that both naturally started and human-ignited wildfires played an important role historically in creating a mosaic of sagebrush structure classes (McAdoo et al. 2013). However, use of fire would require the development of new prescriptions that limit its spread and more closely resemble how Native Americans used fire in sagebrush before Euro-American contact (McAdoo et al. 2013). Controlled burning also carries the risk of promoting invasive plant species, damaging untargeted vegetation that may be included in the treatment block, and damaging or destroying special status species. More traditional burning prescriptions would continue to work in crested wheatgrass seedings as a site preparation method.

Successful treatment of crested wheatgrass seedings also includes seeding or planting desired species, including sagebrush, as well as reducing the extent of crested wheatgrass. Mechanical treatment, such as disking, or using herbicides can reduce crested wheatgrass, followed by seeding or planting (Hulet et al. 2010; Fansler and Mangold 2011; Davies et al. 2013). Disking alters soil characteristics and can damage or destroy sagebrush and native herbaceous species.

Herbicides to specifically treat crested wheatgrass do not exist, which means that some damage to other herbaceous species is likely, particularly at higher application rates designed for greater reductions in crested wheatgrass. Planting sagebrush would result in greater establishment of sagebrush at lower levels of crested wheatgrass control than would seeding (Davies et al. 2013). Restoration in patches or strips would reduce the extent of adverse impacts on whatever existing native vegetation was already present than treating the entire seeding (Davies et al. 2013). The establishment of desired herbaceous species depends on the volume and timing of precipitation after seeding (Hulet et al. 2010). The additional treatment of crested wheatgrass may be needed, as it can recover to near pre-treatment levels within 2 to 5 years (Hulet et al. 2010; Fansler and Mangold 2011).

Actions taken to improve GRS habitat in sagebrush and crested wheatgrass seedings can have unintended consequences on untargeted vegetation communities (aspen, mountain shrub, salt desert scrub, and riparian vegetation) and on special status plants. For one, treatment blocks often include untargeted vegetation communities. Aspen, mountain shrub, and salt desert scrub are most likely to be found around the edges of treatment blocks with easily recognized

physical features as boundaries, such as roads and ridgetops. Riparian communities and special status plant populations are likely to be present in the interior of treatment blocks.

All forms of treatment could alter plant community composition or damage or destroy untargeted communities and special status plants through such factors as heavy equipment compacting, trampling, crushing, and uprooting the plants; direct kill from herbicide drift; burning from prescribed fire; and herbivory when using biocontrols for invasive plant species. Physical disturbance poses a bigger threat than prescribed fire (Lavin et al. 2013). The more area planned for vegetation treatments to benefit GRSB, the higher the potential to adversely affect untargeted vegetation communities and special status plants (**Table 4-37**).

The BLM has several policies in place to reduce potential adverse impacts on untargeted vegetation. Treating riparian areas is avoided unless the planned treatment would also help restore riparian vegetation and functioning condition. By law, the BLM must adhere to label directions for applying any given herbicide. Using ground-based application methods and applying herbicides when wind speeds are low minimize the risks of herbicide drift (BLM 2010a). Broad-leaved species are vulnerable to herbicides that target broad-leaved plants. Anecdotal evidence suggests imazapic kills more forbs than the label indicates.

In addition, the BLM must conduct surveys for special status plants and take protective measures before project implementation, largely because potential species response to various treatment types is not known. One difficulty, however, is that special status plant surveys occur only once before project implementation. Surveys conducted at the wrong time of year may not detect special status species, which is most likely to occur with species that are short-lived and bloom in early spring. Several annuals and some biennial and geophyte species do not bloom every year, and thus can be missed in the survey.

The treatment responses of a few special status plants are known. Most paintbrush species (*Castilleja* spp.) are partial root parasites on sagebrush (Coffey 2004) and tend to disappear when sagebrush is killed over large areas. Long-flowered snowberry (*Symphoricarpos longiflorus*) typically resprouts following fire. Many milkvetch species (*Astragalus* spp.) have relatively large populations within sagebrush and resprout after top-killing, so they would likely respond favorably to burning. Burning too frequently or burning dense sagebrush on a large scale, however, may produce sufficient fire intensity or severity to damage special status species and other untargeted vegetation through lethal heating of the soil, through lethal heating of leaves, buds, and stems (scorch), or through direct consumption by flames. Species particularly

sensitive to fire are those with primary meristems⁴ at or above the soil surface and those that are weak sprouters, such as mountain mahogany.

Wildland Fire

Unplanned fire ignitions could cause short- or long-term damage to all vegetation, including special status plants, depending on the seral stage and vegetation community affected, the extent, and the severity of the fire. In the short term, fire and fuels treatments may remove untargeted vegetation and cause bare areas to be more susceptible to soil loss or nonnative plant invasion.

In the long term, wildland and prescribed fires and fuels treatments would reduce dense vegetation, would create vegetation mosaics, would improve herbaceous understory populations and diversity, and would return nutrients to the soil. Often, fire and fuels treatments improve vegetation diversity and ecosystem function and lower the risk for an uncharacteristically large or severe wildfire. Emergency stabilization and rehabilitation can help stabilize soils and reestablish desirable plant communities.

The use of fire as a restoration tool is described above under *Sagebrush and Crested Wheatgrass Seeding Management*.

Livestock Grazing and Range Management

Livestock grazing can alter the herbaceous plant community through differential pressure because some species are preferred and others are avoided. The BLM converted large areas of degraded sagebrush steppe to crested wheatgrass largely because it can tolerate higher grazing pressure than native vegetation. Restoring crested wheatgrass seedings reduces the extent of these areas that may be more attractive to livestock than native plant communities.

However, moderate levels of livestock use are generally considered compatible with maintaining perennial bunchgrass, with the level of sustainable use depending on a number of environmental factors (Hagen 2011; Boyd et al. 2014). In addition, properly managed grazing can help restore functioning condition of riparian areas where the main problem is altered vegetation. It can also reduce litter and fine fuel loading, helping to reduce fire size and severity under moderate burning conditions (Boyd et al. 2014; Strand et al. 2014).

Grazing practices that maintain or improve rangeland health avoid many of the potentially adverse effects of grazing. The BLM uses rangeland health evaluations to assess rangeland condition and to identify where a change in grazing management would be beneficial to rangeland health. However, special status plant species remain vulnerable to livestock grazing, due to scattered and limited distribution and low populations. Managing areas as unavailable to livestock grazing increases the protection of any special status plants in the closed area,

⁴Growing points

although vulnerability to loss from wildfire may increase as fine fuel loads build in the absence of grazing (**Table 4-37**).

Table 4-37
Estimated Acres of Management Allocations and Planned Treatment Level Important to Special Status Plants

Management Allocation and Planned Treatment	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Unavailable to grazing	246,609	246,609	11,762,357	335,588	246,609	2,502,210	297,601
Closed to OHV travel	300,328	300,328	300,328	300,328	274,965	300,328	367,108
Limited to existing roads and trails	5,325,377	7,996,165	10,937,171	7,996,165	6,043,851	7,996,165	11,043,240
ROW exclusion for major ROWs ²	857,564	4,866,030	10,682,124	857,564	4,866,030	10,682,124	858,203
Closed to fluid mineral leasing	3,073,567	6,327,708	10,167,888	3,073,567	6,327,708	10,167,888	3,073,567
Open to fluid mineral leasing, subject to NSO	860,003	586,757	187,825	3,413,017	586,757	187,825	3,867,197
Open to fluid mineral leasing, subject to CSU	4,281,916	2,498,309	790,972	4,660,101	2,498,309	790,972	4,205,921
Closed to mineral minerals disposal	3,188,080	6,421,645	10,221,771	6,421,645	6,421,645	6,421,645	6,453,084
Vegetation treatment ³	49,483	49,483	49,483	108,856	49,483	49,483	108,011

¹Core and low density acres apply to Alternative E; PHMA and GHMA acres apply to all other action alternatives.

²By law, certain ROWs cannot be completely excluded; exclusion may apply to some uses, such as commercial-scale wind and solar development, and not others, such as providing legal access to a private in-holdings, depending on the alternative.

³Estimated annual treatment level within 4 miles of occupied and pending leks.

Water developments and fencing also facilitate movement, distribution and concentration of livestock more evenly across the range, improving and reducing impacts on vegetation communities and soils by restricting access during critical plant growth periods, providing rest after wildfires, using underused areas, and deferring use to times when soils are saturated.

Wild Horse and Burro Management

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across portions of the sagebrush biome. Wild horse and burro grazing has impacts similar to livestock grazing in its effect on soils, vegetation health, species composition, water, and nutrient availability by consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly 2004), despite differences in grazing techniques and habits.

A horse consumes 20 to 65 percent more forage than a cow of equivalent body mass, due to physiological differences (Connelly et al. 2004). Horses and burros can reduce total vegetation cover, lower sagebrush canopy cover, increase shrub canopy fragmentation, and lower species richness in GRSG habitat (Beever and Aldridge 2011). Additionally, because horses use higher elevations and steeper slopes than cattle, wild horse grazing occurs in areas of sagebrush that cattle do not typically graze (Connelly et al. 2004). Effects of wild horses on habitats may also be more pronounced during periods of drought and vegetation stress (NTT 2011, p. 18). Unlike livestock, wild horse and burro use is yearlong and can have more impacts on vegetation cover than livestock use. These effects would be amplified if wild horses and burros were to exceed AML.

Travel and Transportation

Most adverse impacts on vegetation occur in areas open to cross-country travel, particularly motorized use. Cross-country motorized travel can compact and displace soil and crush plants, especially along popular routes and hill-climbing areas. Vegetation cover loss and soil rutting can occur when soils are wet. They also promote erosion and can lead to rill and gully formation, further damaging plant communities. Special status plant species are particularly vulnerable to damage from OHV cross-country travel. Many special status plant populations occur only at single known sites with only a few individual plants. Restrictions on cross-country motorized use in GRSG habitat would limit damage to special status plants in these areas (**Table 4-37**). Such restrictions would limit use to designated routes, would close areas for the season, and would limit the number of users or types of uses permitted (NTT 2011).

Lands and Realty

ROW construction could have either short-term or permanent impacts on vegetation, depending on the type of ROW involved. Aboveground linear and underground ROWs, such as transmission lines or pipelines, would temporarily remove vegetation during construction, but areas would be reclaimed or restored after construction. Vegetation could be unintentionally damaged or removed occur during project construction, but impacts are likely to be short-term. Maintenance could cause ongoing impacts on a smaller scale. Conversely, construction and maintenance of surface linear ROWs, such as roads, would permanently remove vegetation. In addition, aboveground and surface linear

ROWs can extend for many miles, fragmenting vegetation communities, potentially introducing or spreading invasive plant species, and damaging or destroying special status plant populations.

Wind and solar energy development in particular can affect large areas, depending on the size of the development and the specific design, especially for solar development. Development may occur on private land, as much of it has thus far, but the generating sites also require transmission lines in order to deliver the generated power to market.

ROW exclusion areas would prohibit all development of ROWs in areas where they are designated (**Table 4-37**), which would directly protect vegetation, including special status plants, from disturbance and removal. In ROW avoidance areas, impacts on vegetation could still occur, but sensitive communities such as riparian areas, as well as special status plants, would be avoided to the extent feasible.

Mineral Resources

Energy and mineral development requires roads, open extraction pits, well pads, wells, borrow areas, leach pads, stockpiles, and other infrastructure, depending on the type of mineral development involved, as well as associated noise, traffic, and lights. These conditions alter, degrade, or entirely displace native ecosystems in the short term and long term (Manier et al. 2013). Surface disturbance associated with mineral development removes vegetation, reduces the condition of native vegetation communities and the connectivity of habitat, and facilitates the spread of invasive plants (NTT 2011). Since most existing mines or claims in Oregon are relatively small, the surface impacts would also be relatively small.

There is also the potential for additional wind energy development and for solar and geothermal development. Wind and solar development are discussed above under *Lands and Realty*. Most geothermal exploration to date has occurred on the periphery of GRSG habitat, reducing the potential impacts from development, although not necessarily from transmission.

Vegetation removal would convert areas to an earlier seral stage, which could change vegetation community succession and reduce desired plant communities or special status plant populations. The remaining vegetation could have reduced vigor or productivity due to mechanical damage, soil compaction, and dust. Impacts would not occur in areas closed to mineral leasing or development, except where leases or claims remain.

The BLM requires reclamation plans for mining before any surface disturbance. Such plans address vegetation, invasive plants, and other important resource values, such as sensitive vegetation communities and special status plants, with the goal of reducing impacts and restoring functional ecosystems. However, given the general lack of knowledge on the needs of special status plants, any

affected populations likely would be permanently lost in the development of salable and locatable minerals. Various stipulations attached to leasable mineral and energy development (e.g., NSO and CSU) pose a lower risk to special status plants and sensitive vegetation, such as riparian areas. Closing areas to new salable and leasable mineral development and withdrawal from locatable mineral development would reduce the potential for adverse impacts on special status plants and sensitive vegetation communities (**Table 4-37**).

4.4.3 Impacts Common to All Alternatives

There are no impacts on vegetation common to all alternatives from any of the management presented in Chapter 2.

Impacts from Special Status Plants Management

Managing to protect special status plant species can affect the size, place, and even type of treatment planned to benefit GRSG. These changes, can, in turn, affect treatment success and whether the treatment is optimally designed to benefit GRSG. However, the likelihood is very low that managing to protect special status plants would have a measureable impact on vegetation treatments designed to maintain, restore, or enhance GRSG habitat. This is because special status plants occur only in specific areas.

4.4.4 Alternative A

Alternative A would provide the lowest level of restoration, moderate potential to adversely affect untargeted vegetation communities, and highest potential to adversely affect special status plants. Older plans generally do not address sagebrush or crested wheatgrass seeding restoration, although such restoration could occur regardless. Newer plans include language for restoring sagebrush to a desirable mix to benefit GRSG and other sagebrush obligate species and increasing species diversity in crested wheatgrass seedings; however these plans do not specify how many acres should be treated.

Further, any treatments that might occur are not necessarily targeted to the sites that would most benefit GRSG and there are no restrictions on how to conduct prescribed burning so that it thins overly dense sagebrush, instead of replacing it. Given the importance of crested wheatgrass seedings to livestock grazing, the likelihood that any restoration would occur is low. Alternative A assumes the current treatment rate would continue, with standard measures taken to protect untargeted vegetation communities, particularly riparian communities. Livestock grazing and cross-country OHVs carry the highest risk to special status plants. Alternative A poses the highest risks to special status plants of the alternatives since no additional closures or restrictions would occur.

Impacts from Vegetation Management

Older plans are generally silent about treating sagebrush to enhance structural diversity, increase resistance to invasion, and manage potential wildfire effects.

The Three Rivers RMP prohibits removal of sagebrush within 2 miles of leks when a wildlife biologist determines such removal would be detrimental to GRSG habitat. Newer plans have objectives or actions to increase structural diversity in sagebrush to meet habitat needs for GRSG, sagebrush obligate wildlife species, or both. The Andrews, Steens, and Lakeview RMPs reference General Technical Report PNW-172 (Maser et al. 1984) for desired shrub cover values. The Lakeview RMP also references the ODFW's 2005 GRSG strategy for guidance on managing vegetation to benefit GRSG. The Southeastern Oregon RMP references tables for structural diversity in sagebrush; this table was published as a BLM Technical Note 417 (Karl and Sadowksi 2005). The Upper Deschutes RMP requires development of a long-term conservation strategy for GRSG habitat, in cooperation with other federal and state wildlife agencies.

Expected acreages for different vegetation treatments under all alternatives is presented in **Table 4-38**. Under Alternative A, the BLM would continue to incorporate vegetation objectives in management actions. This would improve the condition and increase the extent of native vegetation in areas where they are applied. In particular, the BLM would manage for the benefit of vegetation that provides wildlife forage, forbs, and sagebrush. BLM vegetation management policy states a preference for using native plant species in post-fire rehabilitation and other restoration work; however, it allows some introduced species in areas where they are necessary for site stabilization, restoration, and protection from invasive plant species.

Table 4-38
Estimated Total Acres of Expected Annual Vegetation Treatments by
Alternative within 4 Miles of Occupied and Pending Leks¹

Alternative	Sagebrush Thinning	Crested		Invasive Plant Control ²	Total
		Wheatgrass Restoration	Conifer Reduction		
A	21,217	0	17,183	11,083	49,483
B	21,217	0	17,183	11,083	49,483
C	21,217	0	17,183	11,083	49,483
D	73,623	0	24,150	11,083	108,856
E	21,217	0	17,183	11,083	49,483
F	21,217	0	17,183	11,083	49,483
Proposed Plan	53,217	1,844	40,250	12,700	108,011

¹Includes post-fire rehabilitation and vegetation management that addresses specific COT report threats.

² Principally annual grasses

Note: in the absence of specific treatment targets, expected treatment acreages for action alternatives are assumed to be equal to Alternative A.

Impacts from Wildland Fire Management

Impacts from wildland fire management would continue under Alternative A, as described in **Section 4.4.2**.

Impacts from Livestock Grazing and Range Management

Livestock grazing would continue to occur under Alternative A, with over 9.98 million acres available for grazing and over 253,000 acres unavailable to grazing on BLM-administered and National Forest System lands. Grazing management must conform to the Oregon-specific standards for rangeland health and guidelines for grazing management as well as direction under 43 CFR, Part 4180, generally; thus vegetation communities would continue to be maintained and improved to some extent across the planning area over the short term and long term. As needed, the BLM would modify grazing management on individual allotments where rangeland health standards were not met and livestock grazing was causing adverse impacts on vegetation. Riparian and wetland areas would be managed to maintain or attain PFC. Closing areas to grazing primarily reduces potential adverse impacts on special status plants.

Impacts from Travel Management

Impacts from OHV use would continue under Alternative A over the short term and long term on 6.8 million acres that would be open to cross-country motorized travel. Impacts would be reduced or eliminated over the 5.6 million acres either closed to cross-country motorized travel or with travel limited to designated routes (**Table 4-37**). Under Alternative A, most GRSG habitat would be open. Route and trail modifications would be considered on a case-by-case basis. Impacts described under **Section 4.4.2** would continue to occur, particularly in areas open to OHV use.

Impacts from Lands and Realty Management

Under Alternative A, lands and realty management would continue, with over 3 million acres of ROW avoidance and over 800,000 acres of ROW exclusion areas. Impacts from ROW avoidance and exclusion areas would be similar to those described under **Section 4.4.2**.

Impacts from Leasable Minerals Management

Under Alternative A, over 3.8 million acres would be open to leasing, while over 3 million acres would be closed (**Table 4-37**). Stipulations and COAs would be applied in certain areas to reduce impacts from mineral leasing or development over the short term and long term, but these stipulations would not be applied consistently across the planning area. Impacts from leasable mineral development on vegetation, as described under **Section 4.4.2**, would continue in areas open to leasing and development.

Impacts from Locatable Minerals Management

Under Alternative A, over 24,000 acres of GRSG habitat would be recommended for withdrawal. Impacts from locatable mineral development on

vegetation, as described under **Section 4.4.2**, would continue to occur in areas open to development.

Impacts from Mineral Materials (Salables) Management

Under Alternative A, over 3 million acres would be closed to mineral materials development, while 8.8 million acres would be open (**Table 4-37**). NSO stipulations would be applied in some areas, which would reduce impacts over the short term and long term. Impacts from mineral materials development on vegetation, as described under **Section 4.4.2**, would continue to occur in areas open to development.

Impacts from Nonenergy Leasable Minerals Management

Impacts would be similar to those described for leasable minerals above (**Table 4-37**). Impacts from nonenergy leasable development on vegetation, as described under **Section 4.4.2**, would continue to occur in areas open to leasing and development.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management are the same as those described for leasable minerals under Alternative A. No additional impacts on vegetation from mineral split-estate management are expected.

Impacts from Special Status Plants Management

Impacts on vegetation are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative A.

4.4.5 Alternative B

Alternative B would provide the same level of restoration and potential to adversely affect untargeted vegetation as Alternative A and the fourth highest potential to adversely affect special status plants. It would provide more targeted direction for sagebrush and crested wheatgrass seeding but would not identify how many acres should be restored over a set period; thus it is unlikely that the average annual number of acres treated would differ from Alternative A.

In the absence of specific objectives, sagebrush and crested wheatgrass seedings may or may not be treated. Alternative B would focus sagebrush restoration primarily on areas where sagebrush is lacking, and it does not address sagebrush that is overly dense. This could increase the risks of large stand-replacing fires and homogeneous burn patterns and the subsequent dominance by invasive annual plants. Alternative B would prohibit the use of fire in warm-dry sagebrush, except as a tool of last resort, thereby removing a potentially valuable method. The effects of removing prescribed fire as a vegetation management tool are not well known, but similar experience in forests suggests that prohibiting fire may well be counterproductive because no other methods have the same biochemical effects as fire.

Although Alternative B would not close any additional areas to livestock grazing, it would roughly double Alternative A's number of acres where cross-country motorized travel would not be allowed. Collectively, all the closures and restrictions would increase the level of protection afforded to special status plants.

Impacts from Special Status Species—GRSG Management

PHMA (4.5 million acres) and GHMA (5.6 million acres) would be designated. The BLM would apply a 3 percent human disturbance cap and would implement numerous conservation measures in PHMA. (Treatments and restoration would not be counted as part of the 3 percent cap.) This would reduce the likelihood for human-caused removal, degradation, or fragmentation of all vegetation, including special status plants.

Impacts from Vegetation Management

Under Alternative B, vegetation management actions would aim to improve GRSG habitat and prioritize restoration to benefit GRSG habitats. The same number of acres would be treated as under Alternative A (**Table 4-37**). The BLM would require the use of native species, would design post-restoration management to ensure the long-term persistence of the restoration, and would consider changes in climate when determining species for restoration.

Together, these management actions would maintain the condition and increase the extent of native vegetation communities, would reduce the likelihood of invasive plant species introduction and spread, and would reduce the extent of invasive plants through restoration and seeding over the long term. Treatments designed to prevent encroachment of trees and nonnative species would alter the condition of native vegetation communities by changing the density, composition, and frequency of species within plant communities. Habitat connectivity for GRSG could be increased through vegetation manipulation designed to restore vegetation, particularly in degraded riparian areas, such as perennial streams that are deeply downcut or incised.

However, requiring the use of native species could limit achieving restoration objectives especially in warm-dry sagebrush or in areas that have already been converted to nonnative annual grasses; this is because native species are not as successful in restoration as some desirable nonnative species. Invasive annual grasses could outcompete native species seedings and become dominant in some areas.

Vegetation manipulations in riparian areas, such as invasive plant treatments, native plantings, and erosion control in the channel, would improve the acreage and condition of the riparian vegetation community, individual riparian species, and hydrologic functionality to attain PFC over the long term.

Impacts from Wildland Fire Management

Fuels treatments under Alternative B would be designed to protect sagebrush ecosystems by maintaining sagebrush cover and applying seasonal restrictions on fuels management activities in winter range. Post-fuels treatments and emergency stabilization and rehabilitation (ES&R) would be designed to attempt to promote long-term persistence of seeded areas and native plant restoration areas. The BLM would also prioritize suppression in PHMA, which would retain the existing conditions and trends of vegetation, including special status plants in these areas. Impacts from fuels treatments, ES&R, and suppression are similar to those described under **Section 4.4.2**.

However, requiring the use of native species could limit achieving restoration objectives, especially in warm-dry sagebrush, or in areas that have already been converted to nonnative annual grasses. This is because native species are not as successful in restoration as some desirable nonnative species. Invasive annual grasses could outcompete native species seedlings in some areas, leading to further reductions in resistance to invasion and resilience from wildfire and increased susceptibility to wildfires.

Impacts from Livestock Grazing and Range Management

Under Alternative B, the BLM would not change acres open or closed to livestock grazing, compared with Alternative A (**Table 4-37**). However, the BLM would implement a number of management actions in PHMA to incorporate GRSG habitat objectives and management considerations into livestock grazing management, as follows:

- Prioritizing completion of rangeland health assessments
- Considering grazing methods and systems to reduce impacts on GRSG habitat
- Improving management of riparian areas and wet meadows
- Evaluating introduced perennial grass seedings, water developments, and structural range improvements

Such measures would help to maintain or improve the acreage and vegetation condition of rangeland and riparian and wetland areas. Together, these efforts would reduce, but would not eliminate, some impacts from grazing on vegetation in PHMA, such as reduced acreage and condition of native vegetation, by focusing conservation measures in PHMA.

Impacts from Travel Management

Under Alternative B, nearly 8 million acres (50 percent more than under Alternative A) would be limited to existing roads, primitive roads, and trails within PHMA not already closed to off-road use (**Table 4-37**). This would reduce the likelihood of impacts caused by roads, as described under **Section 4.4.2**.

Impacts from Lands and Realty Management

Managing PHMA as ROW exclusion (4.8 million acres, four times more than Alternative A) and GHMA as ROW avoidance areas (6.1 million acres, 77 percent more than Alternative A) would reduce impacts on vegetation, as described under **Section 4.4.2**.

Impacts from Leasable Minerals Management

In addition to acres closed to fluid mineral leasing in PHMA (over two times more acres closed than under Alternative A), the BLM would require numerous conservation measures in leased PHMA. Over the long term, closures and NSO stipulations would protect existing vegetation from removal, degradation, fragmentation, and nonnative invasive plant introduction or spread in unleased areas. Conservation measures would help to reduce such impacts in leased areas; restoration would improve the condition and would increase the extent of vegetation and, depending on the location, could remove nonnative invasive plants and reduce fragmentation.

Impacts from Locatable Minerals Management

The BLM would recommend all PHMA for withdrawal from locatable mineral entry (43 CFR, Part 2300; 168 times more acres than under Alternative A), which would reduce the likelihood that vegetation, including special status plants, would be removed, degraded, or fragmented in these areas over the short term and long term.

Impacts from Mineral Materials (Salables) Management

In addition to acres closed to mineral material sales (over two times more than under Alternative A; **Table 4-37**), the BLM would restore salable mineral pits no longer in use. Over the long term, closures would protect existing vegetation, including special status plants, from removal, degradation, fragmentation, and nonnative invasive plant introduction or spread. Restoration could take many years but would ultimately increase the extent of vegetation and, depending on the location, could remove nonnative invasive plants and reduce fragmentation.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative B, PHMA would be closed to nonenergy leasable mineral leasing (over twice the acres of Alternative A), and BMPs would be required on existing leases. This would prevent impacts on vegetation from nonenergy leasable mineral development in unleased areas, as described under **Section 4.4.2**. It also would reduce impacts in leased areas.

Impacts from Mineral Split-Estate Management

Under Alternative B, over twice the acres would be closed to fluid mineral leasing compared with Alternative A. In addition, conservation measures and RFDs would be applied on mineral split-estate in PHMA where possible. This would reduce impacts on vegetation, as described for leasable minerals on these lands.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative B.

4.4.6 Alternative C

Alternative C would have the same level of restoration as Alternative A and slightly less potential to adversely affect untargeted vegetation due to additional restrictions on treatment types and locations. It would have the least potential to adversely affect special status plants in the short term but may be counterproductive in the long term.

Alternative C would focus treatments on sagebrush where canopy cover is lacking and on crested wheatgrass seedings. However, it has the highest number of restrictions on where vegetation treatments can occur and what methods can be used, thereby reducing potential treatment effectiveness and potentially failing to restore degraded winter range.

Nearly all GRSG habitat would be closed to grazing and OHV travel. However, since native ungulate populations are not high enough to make up the difference, the lack of livestock grazing would promote buildup of dead fuels in the bunchgrasses across much of the landscape, leading to higher potential of mortality following wildfire and opening habitat for invasive annual grasses (Davies et al. 2009; Strand et al. 2014). That effect would eventually reduce special status plant populations.

Impacts from Special Status Species—GRSG Management

Impacts from designation of PHMA are similar to those described for Alternative B. The exception is that they would apply to a larger area (all occupied habitat) and a zero percent disturbance cap would be applied, thus protecting more vegetation under Alternative C.

Impacts from Vegetation Management

Management under Alternative C would be similar to that described under Alternative A, though with an increased focus on restoration. Impacts are similar to those described for Alternative A; however, impacts would be reduced over the long term in areas where vegetation can be restored to the reference state of the appropriate ecological site description. In some areas, this restoration may not be possible, especially given the requirement in Alternative C to use local ecotypes of native species. Since some native species are poor competitors against invasive plants, especially annual grasses, the sole use of these plant species in restoration in the warm-dry sagebrush, or in areas already converted to annual grasses, could limit achieving restoration.

Impacts from Wildland Fire Management

Impacts from wildland fire management on vegetation under Alternative C are similar to those described for Alternative A.

Impacts from Livestock Grazing and Range Management

Under Alternative C, livestock grazing would be removed from all occupied GRSG habitats (**Table 4-37**). The effects of livestock exclusion would depend on site conditions, including climate, soils, fire history, and disturbance and grazing history (Strand and Launchbaugh 2013). Grazing is associated with direct and indirect impacts on vegetation as described below and in **Section 4.4.2**.

There is evidence that improper grazing can reduce resistance to invasion from cheatgrass (Reisner et al. 2013), reduce water infiltration, increase soil compaction and erosion, and decrease water quality (Braun 1998; Dobkin et al. 1998, in USFWS 2010a). Cessation of grazing could relieve these impacts and allow for recovery of native understory perennials and could increase cover of sagebrush and herbaceous understory vegetation (Strand and Launchbaugh 2013). This would improve habitat components important to GRSG nest success, including cover and forage, by increasing the insect population.

However, the effects of grazing on perennial grass cover in sagebrush steppe and semidesert communities depends on a number of factors, including precipitation, soil characteristics, season of grazing, grazing intensity, and type of herbivore (Strand and Launchbaugh 2013). Furthermore, information regarding the influence of longer term rest from grazing is limited, and ecosystem properties may not necessarily be improved (Davies et al. 2014).

Research suggests that understory herbaceous productivity does not increase in depleted sagebrush ranges when grazing is removed (Beck and Mitchell 2000). Other studies have shown that changing grazing management from detrimental use to modern recommended grazing practices or dormant season use likely has the same benefits as long-term grazing rest in some instances (Davies et al. 2014). When all rangeland health standards have been met, it is expected that current grazing management is adequate to support GRSG habitat objectives, so removing grazing may not have additional benefits. In addition, in some areas, passive restoration is not sufficient to improve GRSG habitat, and in these areas, restoration is necessary (Davies et al. 2011).

Riparian and wetland areas that have been altered by grazing-associated water developments would be restored over the long term. This could increase the acreage and improve the condition of these vegetation communities toward PFC. However, impacts from wild horses and burros and other wildlife use of riparian and wetland areas would continue.

In addition, moderate livestock grazing has been shown to decrease the risk of adverse wildfire effects in sagebrush steppe plant communities, so removing grazing could also allow for buildup of fuel from grasses that could otherwise be consumed by livestock. This could result in stand replacement and loss of vegetation over large areas in both the short term and long term. The influence on fire spread, severity, and intensity would depend on such factors as weather, fuel characteristics, and landscape features. Evidence suggests that the potential

role of grazing on fire behavior is limited under extreme burning conditions—low fuel moisture and relative humidity and high temperature and wind speed (Strand and Launchbaugh 2013).

Impacts from Travel Management

Under Alternative C, nearly 11 million acres (over twice that of Alternative A) would be limited to existing roads, primitive roads, and trails in PHMA not already closed to off-road use (**Table 4-37**). This would reduce the likelihood of impacts caused by roads, as described under **Section 4.3.2**.

Impacts from Lands and Realty Management

Managing all occupied habitats and ACECs as ROW exclusion (10.6 million acres, 12 times more than Alternative A) would reduce impacts on vegetation, as described under **Section 4.4.2**.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative C are similar to those described for Alternative B, although both PHMA and GHMA would be closed to leasing (over three times more acres than under Alternative A).

Impacts from Locatable Minerals Management

Under Alternative C, over 8.8 million acres would be recommended for withdrawal (363 times more acres than under Alternative A). This would prevent impacts on vegetation from locatable mineral management, as described under **Section 4.4.2**.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, over three times more acres would be closed to mineral materials disposal compared with Alternative A. This would prevent impacts on vegetation from salable mineral management, as described under **Section 4.4.2**.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative C, over three times more acres would be closed to nonenergy leasable mineral exploration and development compared with Alternative A. This would prevent impacts on vegetation from nonenergy leasable mineral development in unleased areas, as described under **Section 4.4.2**.

Impacts from Mineral Split-Estate Management

Under Alternative C, the BLM would manage over 3.5 times more acres as closed to fluid mineral leasing on split-estate lands, compared to Alternative A. Such management would reduce impacts on vegetation, as described under **Section 4.4.2**.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative C.

4.4.7 Alternative D

Alternative D would increase the number of acres treated compared with Alternative A, with a concomitant increased potential to adversely affect untargeted vegetation communities and the fifth highest potential to adversely affect special status plants. Alternative D would focus treatments on both dense sagebrush and sagebrush that is too open, but the alternative is silent on treating crested wheatgrass seedlings.

Alternative D would establish a specific treatment level over a 10-year period for vegetation treatments generally but leaves it up to BLM districts to determine how much of the target to apply to restoring sagebrush. Treatment of crested wheatgrass seedlings could occur, but given the importance of these seedlings to livestock grazing, the probability of treatment is low. Alternative D would close additional acres to livestock grazing and provide the same amount of restrictions on cross-country travel by OHVs as Alternative B. The limits and closures would provide the third highest level of protections for special status plants.

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on vegetation under Alternative D are the same as those described for Alternative B.

Impacts from Vegetation Management

Management under Alternative D would be similar to that described for Alternative B. However, the BLM would conduct sagebrush treatments over 2.5 times more acres and would increase juniper treatments by 40 percent (**Table 4-37**). The BLM would identify strategic areas to prioritize restoration projects and would use the most current science when implementing restoration projects. In addition, Alternative D provides guidance and priorities for sagebrush, juniper, and invasive plant treatments. Invasive plant prevention measures would be incorporated during wildfire response and other agency activities. Together, these management actions would improve the likelihood for successful sagebrush restoration and vegetation and invasive plant treatments in GRSG habitat over the long term.

Impacts from Wildland Fire Management

Wildland fire management under Alternative D would be similar to that described for Alternative B, with additional management flexibility and guidance incorporated to tailor management to specific vegetation communities. The BLM would implement a comprehensive approach, with priorities for fuels management, wildfire management, and emergency stabilization and rehabilitation within GRSG habitat. This would improve wildland fire

management over the short term and long term, given the limited resources available, and would target those areas that need most protection. Alternative D also establishes quantifiable objectives that would provide a measurable indication of progress or success. As a result, the likelihood for large severe wildfires would be reduced over the long term, and subsequent impacts on vegetation from wildfire, as described under **Section 4.4.2**, would also be reduced.

Impacts from Livestock Grazing and Range Management

Under Alternative D, the BLM would manage 36 percent more acres as unavailable to grazing compared with Alternative A (**Table 4-37**). This is because some key RNAs would be closed to grazing, based on certain criteria, including nonattainment of rangeland health standards. In addition, the BLM would prioritize allotments for processing grazing permits and leases and would prioritize rangeland health assessments in GRSG habitat; management would change when the authorized livestock use was the cause for not maintaining or improving GRSG habitat values (43 CFR, Part 4180.2[c] and Standard 5). Such measures could improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. The risk of unintentional damage to untargeted vegetation and special status plants remains where lands are available to grazing. Together, these efforts would improve consistency of management across the sub-region and would reduce impacts from grazing on vegetation, described in **Section 4.4.2**.

Impacts from Travel Management

Impacts on vegetation from travel management under Alternative D are the same as those described for Alternative B.

Impacts from Lands and Realty Management

Impacts on vegetation from lands and realty management under Alternative D are similar to those described for Alternative A. The same acreage would be managed as ROW exclusion areas, though nearly 75 percent more acres would be managed as ROW avoidance areas, providing additional protection to sensitive vegetation and special status plants in these areas.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative D are similar to those described for Alternative A (**Table 4-37**). However, nearly four times more acres would be open to leasing subject to NSO stipulations, thereby reducing impacts, as described in **Section 4.4.2**.

Impacts from Locatable Minerals Management

Impacts on vegetation from locatable minerals management under Alternative D are the same as those described for Alternative A.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from mineral materials management under Alternative D are the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative D, impacts from closure to nonenergy leasable mineral exploration and development would be the same as those described for Alternative A. However BMPs and restoration would be required on existing leases. This would reduce impacts on vegetation from nonenergy leasable mineral development in unleased and leased areas, as described under **Section 4.4.2**.

Impacts from Mineral Split-Estate Management

Impacts from mineral split-estate management under Alternative D are similar to those described for Alternative A. However, over 400,000 acres would be open to leasing, subject to NSO stipulations, under Alternative D, thereby reducing impacts, as described in **Section 4.4.2**.

Impacts from Special Status Plants Management

Alternative D includes additional special status plants management to conserve or recover special status plants and prevent future listing of species. Measures include maintaining current inventories, developing project-level mitigation measures, and monitoring populations. Such measures would increase the likelihood of retaining the number and size of special status plant populations throughout the decision area over the short term and long term.

4.4.8 Alternative E

Alternative E would provide the same level of restoration as Alternative A, with slightly less potential to adversely affect untargeted vegetation due to additional restrictions on treatment types. Alternative E would have the third highest potential to adversely affect special status plants. Alternative E would not specify how many acres should be treated over any period and would include more restrictions on where certain treatment methods could be applied. Vegetation treatments would be targeted toward sagebrush lacking sufficient canopy cover and crested wheatgrass seedings. Other than providing a clearer focus on what to treat, in the absence of specific vegetation treatment objectives, Alternative E would not result in measurable changes in how much is treated, as compared with Alternative A. As a result, Alternative E would provide the third lowest level of additional protection for special status plants.

Impacts from Special Status Species—GRSG Management

Management of core area and low density habitat under Alternative E would have impacts similar to those described for Alternative B.

Impacts from Vegetation Management

Vegetation management under Alternative E emphasizes controlling invasive plants, avoiding conversion of sagebrush to increase livestock forage, and using the connectivity model and habitat monitoring techniques in the ODFW plan.

Invasive plant management includes conducting systematic detection surveys, setting priorities for invasive plant control, and establishing invasive plant protection areas. It provides guidance for detection, control, prevention, containment, and rehabilitation and restoration. The same number of acres would be treated as under Alternative A (**Table 4-37**). Some guidance is also provided for conducting vegetation treatments. Overall, Alternative E would likely substantially reduce the introduction and spread of invasive plants over the short term and long term, compared with Alternative A.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative E are similar to those described for Alternative D.

Impacts from Livestock Grazing and Range Management

Impacts on vegetation from livestock grazing under Alternative E are similar to those described for Alternative A. Alternative E emphasizes incorporating thresholds and responses in grazing permits. These would be more likely to reduce impacts on vegetation and special status plants compared with Alternative A if changes in livestock grazing management were made more quickly than under other alternatives.

Impacts from Travel Management

Impacts on vegetation from travel management under Alternative E are the same as those described for Alternative B (**Table 4-37**).

Impacts from Lands and Realty Management

Impacts from lands and realty management under Alternative E would be similar to those described for Alternative A (**Table 4-37**). However, fewer ROW avoidance areas would be managed under Alternative E, thus providing fewer protections to sensitive vegetation and special status plants.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative E are the same as those described for Alternative B.

Impacts from Locatable Minerals Management

Impacts on vegetation from locatable minerals management under Alternative E are the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from mineral materials management under Alternative E are the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on vegetation from nonenergy leasable minerals management under Alternative E are the same as those described for Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management are the same as those described for leasable minerals under Alternative E. No additional impacts on vegetation from mineral split-estate management are expected.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There would be no additional impacts on vegetation from special status plant management under Alternative E.

4.4.9 Alternative F

Alternative F would be similar to Alternative C in the level of expected restoration and potential to adversely affect untargeted vegetation; however, Alternative F would have the second highest potential to adversely affect special status plants. The primary differences between Alternatives C and F is that Alternative F would not close additional areas to livestock grazing or further restrict OHV use. Alternative F has many of the same restrictions on how and where vegetation treatments can be conducted as Alternative C, which would reduce the potential effectiveness of restoration. However, by leaving much more area open to livestock grazing, Alternative F would avoid the potential risks of additional fuel buildup and resulting adverse fire effects under Alternative C. Alternative F would provide similar risks to special status plants as Alternative A.

Impacts from Special Status Species—GRSG Management

Impacts on vegetation from GRSG management under Alternative F are similar to those described for Alternative B. However, Alternative F would provide greater restrictions on allowable uses, and the 3 percent disturbance cap would include prescribed fire. This would further reduce the acreage of vegetation that would be removed or fragmented by human disturbances in occupied habitat over the long term.

Impacts from Vegetation Management

Impacts on vegetation from vegetation management under Alternative F are the same as those described for Alternative B.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative F are similar to those described for Alternative A.

Impacts from Livestock Grazing and Range Management

Impacts from livestock grazing management under Alternative F are similar to those described for Alternative B, though Alternative F would reduce grazing by

62 percent (amount that grazing AUMs would be reduced) (**Table 4-37**) and the BLM would incorporate more stringent guidance and restrictive measures. This could further reduce impacts on vegetation in GRSG habitat areas, depending on where and how the measures were applied.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative F are similar to those described for Alternative B, though there would be fewer impacts on vegetation, including special status plants, under Alternative F. This is because no new road construction would be allowed within 4 miles of leks in PHMA and mitigation of impacts from route construction would be required. Acres open, closed, and limited to OHV use would be the same as those described for Alternative A (**Table 4-37**).

Impacts from Lands and Realty Management

Impacts from management of ROW avoidance and exclusion areas under Alternative F are the same as those described under Alternative C.

Impacts from Leasable Minerals Management

Impacts on vegetation from leasable minerals management under Alternative F are the same as those described for Alternative C.

Impacts from Locatable Minerals Management

Impacts on vegetation from locatable minerals management under Alternative F are the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from salable minerals management under Alternative F are the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on vegetation from nonenergy leasable minerals management under Alternative F are the same as those described for Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management under Alternative F are the same as those described for Alternative C.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There are no additional impacts on vegetation from special status plant management under Alternative F.

4.4.10 Proposed Plan

The Proposed Plan would provide a similar level of restoration as Alternative D, with similar potential to adversely affect untargeted vegetation. It would provide the second highest level of protection for special status plants. The Proposed

Plan would include specific restoration targets for sagebrush and crested wheatgrass seedlings within 4 miles of occupied and pending leks, addressing the habitat used by approximately 90 percent of the birds using those leks. Some, but not all, connectivity habitat would be included within that 4-mile radius, potentially leading to weaker connections between some populations.

The Proposed Plan is the only alternative that would target crested wheatgrass seedlings. It focuses sagebrush restoration on dense sagebrush, assuming that time is one factor in what is needed to increase sagebrush canopy cover where it is lacking. The Proposed Plan would close all or parts of key RNAs to livestock grazing and would increase the number of acres with restrictions on OHV use by 2.6 times over Alternative A. These, plus additional closures and restrictions in new ROW development and new mining activities, provide the second highest level of protection for special status plants.

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on vegetation under the Proposed Plan would be similar to those described for Alternative B. However, the Proposed Plan would include management of SFA within PHMA. This would provide greater restrictions on allowable uses, including fluid mineral and locatable mineral development. RDFs, buffers, and seasonal restrictions would be applied to leks in PHMA and GHMA. A 3 percent disturbance cap would be applied and mitigation would be required for human disturbances. These actions would further reduce the acreage of vegetation, including special status plants, which would be disturbed, removed, or fragmented by human disturbances over the long term.

Impacts from Vegetation Management

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over two times more sagebrush and juniper treatments and 14 percent more invasive plant species treatments compared with Alternative A. The BLM would also begin crested wheatgrass treatments and would remove conifers encroaching into sagebrush habitats (**Table 4-37**). In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would increase the resistance of GRSG habitat to invasive annual grasses and the resiliency of GRSG habitat to disturbances. The Proposed Plan also includes management to improve GRSG habitat in crested wheatgrass seedlings. Together, these management actions increase the amount of suitable GRSG habitat over the long term.

Impacts from Wildland Fire Management

A comprehensive strategy for wildland fire management would be implemented under the Proposed Plan, including recommendations from the GRSG Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment. The assessment would identify priority habitat areas and management strategies to reduce the

threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would incorporate recent scientific research on resistance and resilience of Great Basin ecosystems as well as interdisciplinary team knowledge. Potential management strategies include proactive measures, such as fuels management and habitat restoration and recovery, and reactive measures, such as wildfire response and post-fire rehabilitation. Together, these actions would improve wildland fire management, given the limited resources available, and would target those areas that need the most protection. As a result, the likelihood for adverse wildfire effects on GRSG habitat, untargeted vegetation, and special status plants, as described under **Section 4.4.2**, would be reduced when compared with Alternatives A through F.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan, all or portions of key RNAs would be unavailable for grazing. The BLM would also implement a number of management actions to meet vegetation objectives in SFA and PHMA, including prioritizing the review and processing of grazing permits and leases in SFA, particularly in areas not meeting rangeland health standards that also contain riparian areas, including wet meadows. Additional management would maintain, enhance, or reestablish riparian areas in GRSG habitat. Such measures could improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. The risk of unintentional damage to vegetation and special status plants remains where lands remain available for grazing. Together, these efforts would improve consistent management across the sub-region and would reduce impacts from grazing on vegetation, described in **Section 4.4.2**.

Impacts from Travel Management

Impacts on vegetation from travel management under the Proposed Plan would be similar to those described for Alternative B. Under the Proposed Plan, over 11 million acres (over two times more than Alternative A) would be closed or limited to existing roads, primitive roads, and trails. This would reduce the likelihood of impacts caused by roads, as described under **Section 4.4.2**.

Impacts from Lands and Realty Management

Under the Proposed Plan, the BLM would manage nearly the same number of acres as ROW exclusion for major and minor ROWs, compared with Alternative A. However, 3 million acres would be ROW exclusion for solar and wind ROWs. In addition, 9.9 million acres (nearly three times more than Alternative A) would be ROW avoidance for major and minor ROWs. Mitigation would be required for all human disturbances. Such management would reduce impacts on vegetation, as described under **Section 4.4.2**.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under the Proposed Plan are similar to those described for Alternative D (**Table 4-37**). In addition, SFA would be

managed as NSO without waiver, exception, or modification, thereby providing additional protections in these areas. Mitigation would be required for all human disturbances, further reducing impacts.

Impacts from Locatable Minerals Management

Under the Proposed Plan, over 1.8 million acres would be recommended for withdrawal (74 times more acres than under Alternative A). This would prevent impacts on vegetation from locatable mineral management on those acres, as described under **Section 4.4.2**.

Impacts from Mineral Materials (Salables) Management

Impacts on vegetation from mineral materials management under the Proposed Plan are similar to those described for Alternative B, though with more acres (over 30,000 acres) closed to disposal. Mitigation would be required for all human disturbances, further reducing impacts.

Impacts from Nonenergy Leasable Minerals Management

Impacts on vegetation from nonenergy leasable minerals management under the Proposed Plan are similar to those described for Alternative B, though with 91 more acres closed to exploration and development. Mitigation would be required for all human disturbances, further reducing impacts.

Impacts from Mineral Split-Estate Management

Impacts on vegetation from mineral split-estate management under the Proposed Plan are similar to those described for Alternative D, though with more acres managed as NSO and fewer acres managed as CSU.

Impacts from Special Status Plants Management

Impacts are the same as those described under **Section 4.4.3**. There are no additional impacts on vegetation from special status plant management under the Proposed Plan.

4.5 FISH AND WILDLIFE

4.5.1 Methods and Assumptions

The fish and wildlife environmental consequences discussion below is focused on the analysis of potential impacts on special status wildlife species from a range of alternative management actions. Implementing management for general fish and wildlife, big game, and migratory birds discussed in **Section 3.5**, Fish and Wildlife, would have negligible or no impacts on those resources and are not addressed in this analysis. Fish species (not Federally listed or proposed species) might be of high economic and recreational value, but the proposed management alternatives within this EIS could have a potential impact on fish species and their habitats. For sagebrush-obligate wildlife species (not Federally listed or proposed species), habitat improvements designed to enhance GRSG habitat and reduce human disturbance activities would improve their habitat

quality, quantity, and connectivity. Impacts on special status plant species are discussed in **Section 4.4, Vegetation**.

Data on known locations and habitats within the planning area are available, however, the data are not complete or comprehensive concerning all special status wildlife species known to occur or potential habitat that could exist. Known and potential special status wildlife species and habitat locations were considered in the analysis; however, the potential for species to occur outside of these areas was also considered, and, as a result, some impacts are discussed in more general terms.

The BLM consulted with the USFWS and NMFS under the Endangered Species Act Section 7 regulations for potential impacts on federally listed and proposed species and critical habitat from implementing the Proposed Plan. The BLM determined “No Effect” to these species (**Appendix W**). Impacts on special status species described below apply only to non-listed or proposed wildlife species.

Impacts on special status wildlife species would primarily result from unmitigated surface disturbance such as wildfires, wildfire-suppression activities, erosion, and trampling. Direct and indirect impacts on special status species may result from any surface-disturbing activity or alteration to occupied habitats. All federal actions would comply with ESA consultation requirements, and all implementation actions would be subject to further special status species review before site-specific projects are authorized or implemented. Federal regulations and BLM policy protecting threatened, endangered, and sensitive species were considered for reducing the potential impacts from permitted activities. If adverse impacts are identified, mitigation measures, including avoidance, would be implemented to minimize or eliminate the impacts.

Indicators

Special Status Wildlife Species

Indicators of impacts on special status wildlife species are as follows:

- Amount and condition of available habitat
- Likelihood of mortality, injury, or direct disturbance
- Likelihood of habitat disturbance

Assumptions

In addition to the assumptions in **Section 4.2.1, Analytical Assumptions**, this analysis includes the following assumptions:

- The analysis presented is largely qualitative due to the lack of data or uncertainty in existing data on certain special status species' occurrences. Furthermore, because special status species may use

currently unoccupied habitat, and wildlife distribution and abundance may fluctuate, predicted effects on occupied habitat and species could change over time as knowledge of species locations increases.

- Short-term effects are defined as those that would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.
- USFWS would be consulted on any action that could potentially affect a listed or proposed wildlife species or their habitat.

4.5.2 Nature and Type of Effects

Special status wildlife species may inhabit the GRSG population areas within the decision area. Special status wildlife habitats on BLM-administered lands within the decision area would be affected under all alternatives, and habitat condition is directly linked to vegetation conditions and progression toward land health standards (**Section 4.4, Vegetation**). Habitat loss or modification due to human activity is a substantial threat to special status species and has effects on species adapted to specific ecological niches. The BLM's land management practices are intended to sustain and promote species that are legally protected and to prevent plant and animal species that are not yet legally protected from needing such protection.

Changes to special status wildlife species and their habitats would be caused by the following: 1) disturbance and disruption from casual use; 2) disturbance and disruption from permitted activities; and 3) changes to habitat conditions. Changes are described for special status species that are not listed or proposed for listing. There would be no effect on listed special status species (see **Appendix L**).

Disturbance and Disruption from Casual Use

The BLM does not actively manage casual use activities on federal lands, however, activities such as recreation, motorized vehicle use, and use of authorized and unauthorized routes can threaten special status wildlife species and their habitat. Examples of impacts on special status wildlife from casual use include habitat loss, fragmentation, or degradation; mortality or injury of animals; sedimentation of waterways; increased turbidity; decreased water quality; disturbance to species during sensitive or critical periods in their life cycle such as spawning, nesting, or denning; short-term displacement; and long-term habitat avoidance by species such as raptors that are sensitive to noise or human presence. Some species would adapt to disturbances over time and could recolonize disturbed habitats. Areas open to motorized travel could impact special status species due to noise disturbance, human presence, potential for invasive plant spread and habitat degradation, and the potential for injury or mortality to wildlife from vehicle collisions.

Both short-term, loud noise (such as from vehicles or construction) and long-term, low-level noise (such as from industrial activities such as oil and gas development) have been documented to cause physiological effects on multiple wildlife species. These effects include increased heart rate, altered metabolism, and changes in hormones, foraging, anti-predator behavior, reduced reproductive success, density, and community structure (Radle 2007; Barber et al. 2009a). In addition, noise can impact wildlife species including mammals and birds through the disruption of communication and environmental cues (Slabbekoorn and Ripmeester 2008; FHA 2011). Determining the effect of noise is complicated because different species and individuals have varying responses, and certain species rely more heavily on acoustical cues than others (Radle 2007; Barber et al. 2009b). Impacts would be both short- and long-term, depending on the type and source of noise, and the depending on the species.

On-site management of recreation and motorized activity, and designation and closure of travel routes could prevent or reduce impacts. Seasonal closure of routes would prevent impacts on species during sensitive or critical times of the year, such as during winter or birthing periods.

Disturbance and Disruption from Permitted Activities

Permitted, surface-disturbing activities (e.g., mineral exploration and development, and ROWs) would result in short-term direct impacts on special status wildlife species through mortality, injury, displacement, and noise or human disturbance caused by increased vehicle traffic and use of heavy machinery. Displacement of species could increase competition for resources in adjacent habitats. Over the long term, these activities would remove and fragment habitats due to road development and use, facility construction and placement, creation of well pads and pipelines, and construction within ROWs. Species could avoid developed areas over the long term, or would adapt and recolonize sites after construction. ROW avoidance and exclusion areas and an human disturbance cap would reduce or avoid habitat impacts and could reduce the total acreage of habitat disturbance and fragmentation.

Bird mortality or injury could occur from collision or electrocution with transmission lines and other ROW structures. Development in areas where there are existing ROWs would reduce impacts, since resident birds could have adapted to the existing ROWs. Wind energy could also cause direct impacts on birds and bats, including blade strikes, barotrauma (injury or mortality caused by rapid or excessive pressure changes), habitat loss, and displacement. Indirect impacts could include introduction of invasive vegetation that may result in alteration of wildfire frequency; increase in predators or predation pressure; decreased survival or reproduction of the species; and decreased habitat effectiveness. Areas managed under NSO, CSU, and TL stipulations would limit surface disturbance and associated impacts in certain areas.

Changes to Habitat Conditions

Vegetation and invasive plant treatments; livestock grazing; GRSG habitat enhancements; wildfire; fuels treatments; and range improvements alter habitat conditions. Overall, the BLM would aim to achieve or move toward achieving Rangeland Health Standard 5: Native, Threatened and Endangered, and Locally Important Species, which would maintain and/or restore habitat values for fish and wildlife. Over the short term, vegetation treatments and wildfire would reduce habitat quality or temporarily remove habitat until the desired condition was established. Invasive plant treatments, when successful, should improve habitat conditions over both the short- and long-term. Over the long term, vegetation and habitat treatments would increase habitat structural and compositional diversity, increase cover and nesting habitat, prevent sedimentation of waterways, and retain riparian and wetland habitats. Depending on the extent and severity, wildland fire can improve habitat for some species based upon their specific habitat needs.

Special Status Species, that use rangelands can benefit from the proper management of livestock. These benefits include providing sustainable, diverse, and vigorous mixtures of native vegetation for forage and habitat. Also, proper management of grazing livestock can control invasive plants and reduce fuel accumulations, protect intact sagebrush habitat, and increase habitat extent and continuity (NRCS 2011). If grazing is unmanaged it could result in, overutilization of forage by livestock, leading to increased competition with wildlife for forage, and potentially reduced cover and nesting habitat for other species. Livestock could also spread invasive plants, which would degrade habitats. Special status wildlife could be displaced from their habitats, which could increase competition for resources in adjacent habitats. Impacts would vary depending on the extent of vegetation removal, type of habitat impacted, and length of the grazing period. Livestock could degrade riparian areas, which could impact riparian-dependent, aquatic, and fish species.

Natural disturbances such as unplanned wildfire ignitions could cause short- or long-term damage to habitats depending on the seral type affected, extent, and severity of the wildfire. In the short term, wildfire removes nesting and cover habitat and leaves bare areas that provide little habitat value and could erode to cause sedimentation of waterways. Wildfire could displace species from suitable habitat, which could increase competition for resources in adjacent habitats. In the long term, wildfires and prescribed fires, as well as fuels treatments, can improve habitat by increasing structural diversity. When properly designed and implemented, prescribed fire and fuels treatments can lower the risk for an uncharacteristically large or severe wildfire that could impact a large acreage of wildlife habitats.

Management actions and special designated areas (e.g., ACECs) that restrict surface-disturbing activities would reduce impacts such as habitat removal, fragmentation, and human disturbance. Such management actions include

stipulations to protect GRSG; closure of areas to mineral leasing and development; ROW avoidance and exclusion areas; areas proposed for withdrawal from mineral entry; restrictions within ACECs; and route closures or restrictions.

Criteria would be used to guide land exchanges, disposals, and acquisitions, which could reduce the fragmentation of BLM-administered land in the planning area. This could improve the BLM's ability to implement management actions that would result in improved habitats, undisturbed fish and wildlife populations, and attainment of land health standards. However, lands identified for disposal could cause fragmentation and habitat loss if the disposed land is converted to other uses, such as agriculture or residential or industrial development.

4.5.3 Impacts Common to All Alternatives

There are no impacts on special status wildlife species that are common to all alternatives.

4.5.4 Alternative A

Impacts from Special Status Species—GRSG Management

There would be no new impacts on special status wildlife species resulting from GRSG management under Alternative A.

Impacts from Vegetation Management

Under Alternative A, the BLM would continue to protect special status species habitat or populations to avoid the species from being federally proposed or listed. These actions would continue to implement current management efforts to protect habitat for all special status species described in **Section 3.5**, Fish and Wildlife, which overlap with GRSG habitat. There would be no new impacts on special status wildlife species resulting from vegetation management under Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative A, the BLM would continue to manage wild horses and burros to AML within 2,657,537 acres of HMAs on GRSG habitat (800,757 acres of PHMA and 1,562,111 acres of GHMA). Impacts on special status wildlife species would occur when wild horse and burro populations exceed AML; this is similar to those described for livestock management in **Section 4.5.2**, *Nature and Type of Effects*. Management actions, including maintaining herds at or below AML, would increase habitat quality for sagebrush-dependent special status species, including many of those listed in **Section 3.5**, *Fish and Wildlife*. Special status fish, amphibians, and other aquatic species habitat quality would also increase under Alternative A as a result of herd management.

Impacts from Wildland Fire Management

Alternative A would limit the number of projects in GRSG spring-summer-fall range to 60 percent of the area in a 10 year period and reduce encroaching

conifers from riparian and sagebrush habitats. These actions would increase and enhance habitat for special status wildlife species that occur in sagebrush and riparian habitats. Special status wildlife that occupy western juniper trees less than 120 years old that are encroaching on sagebrush or GRSG riparian areas would have reduced habitat as a result of Alternative A. Impacts from wildland fire on special status wildlife species described in **Section 4.5.2, Nature and Type of Effects**, would continue under Alternative A.

Impacts from Livestock Grazing and Range Management

Under Alternative A, 12,258,337 acres would remain available to livestock grazing, and 253,504 would remain unavailable to livestock grazing. Under Alternative A, livestock grazing could be used to promote the establishment of sagebrush by reducing stands of competing vegetation. Efforts to enhance and maintain wet meadows including riparian and wetlands, would be managed to meet proper functioning condition status. Seeding projects would increase desirable forage in areas of low vegetation diversity. These actions could result in increased habitat for sagebrush dependent special status species including many of the species listed in **Section 3.5, Fish and Wildlife**. Special status fish, amphibians, and other aquatic species habitat would increase under Alternative A as a result of riparian and wetlands restoration activities.

Impacts from Travel Management

Under Alternative A, approximately 6,811,890 acres would remain open to unrestricted cross-country motorized travel. Impacts on special status wildlife species as a result of continued motorized vehicle use described in **Section 4.5.2** would continue.

Impacts from Lands and Realty Management

Under Alternative A, lands and realty would continue to manage approximately 857,564 acres as ROW exclusion and approximately 3,445,685 acres as ROW avoidance areas. Management actions would not change under Alternative A and, therefore, there would be no new impacts on special status wildlife species.

Impacts from Leasable Minerals Management

Under Alternative A, 7,560,605 acres of GRSG habitat (3,720,426 acres of PHMA and 3,840,179 acres of GHMA) would continue to be open to mineral leasing; 2,657,254 acres (1,117,502 acres of PHMA and 1,539,752 acres of GHMA) would be closed. Impacts on special status wildlife species that occupy GRSG as a result of leasable minerals management, including habitat avoidance and other impacts described in **Section 4.5.2**, would continue in areas open for leasing under Alternative A.

Impacts from Locatable Minerals Management

Under Alternative A, areas inhabited by federally-listed species and lands within 0.6 miles of GRSG leks would be withdrawn or recommended for withdrawal from locatable mineral exploration and development. Areas that remain open for locatable mineral development that overlap with special status wildlife

species not federally-listed, including the majority of bird, amphibian, mammal, and invertebrate species would continue to be impacted under Alternative A as described in **Section 4.5.2**.

Impacts from Mineral Materials (Salables) Management

Similar to the management actions proposed under locatable minerals in Alternative A, areas inhabited by federally-listed species and lands within 0.6 miles of GRSG leks would be withdrawn or recommended for withdrawal from mineral exploration and development. Areas that remain open for mineral development that overlap with special status wildlife species not federally-listed, including the majority of the bird, amphibian, mammal, and invertebrate species, would continue to be impacted under Alternative A as described in **Section 4.5.2**.

Impacts from Nonenergy Leasable Minerals Management

Nonenergy leasable minerals management actions proposed under Alternative A would have similar impacts on special status wildlife species as described for locatable minerals and mineral materials management above. Areas inhabited by federally-listed species and lands within 0.6 miles of GRSG leks would be withdrawn or recommended for withdrawal from mineral exploration and development. Areas that remain open for mineral development that overlaps with special status wildlife species not federally-listed, including the majority of the bird, amphibian, mammal, and invertebrate species, would continue to be impacted under Alternative A as described in **Section 4.5.2**.

Impacts from Mineral Split-Estate Management

Under Alternative A, management of mineral split-estate would not close, withdraw, or propose to withdraw locatable mineral entry. Approximately 2,216,012 acres would continue to remain open to locatable mineral exploration or development. Impacts on special status wildlife species would continue as described in **Section 4.5.2**.

Impacts from Special Designations Management

Management of 715,048 acres of ACECs would continue to protect wildlife habitat and special status species under Alternative A. Management actions would not change under Alternative A and, therefore, there would be no new impacts on special status wildlife species.

Impacts from Air Quality and Climate Change Management

The current RMPs do not address climate change. Therefore, under Alternative A, no new impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative A.

4.5.5 Alternative B

Impacts from Special Status Species—GRSG Management

Under Alternative B, 4,547,043 acres of PHMA and 5,662,632 acres of GHMA would be designated and a 3 percent disturbance cap on human activities in PHMA would be applied. Compared with Alternative A, the actions proposed under Alternative B would increase habitat protection for special status wildlife species that occupy GRSG habitat listed in **Section 3.5**, Fish and Wildlife.

Impacts from Vegetation Management

Vegetation restoration efforts proposed under Alternative B would prioritize projects that would most likely improve GRSG habitat including seasonally important habitats and riparian areas. Special status wildlife species, including riparian species that overlap with GRSG habitat would receive increased habitat quality and protection under the vegetation management actions proposed under Alternative B compared with Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative B, management of wild horses and burros would incorporate GRSG objectives and assess land health within HMAs. These actions would likely increase habitat quality and protection for special status wildlife species within these areas relative to Alternative A.

Impacts from Wildland Fire Management

Wildland Fire management under Alternative B in PHMA would be designed and implemented to protect existing sagebrush communities. These actions would likely reduce impacts from wildfire on GRSG habitat as described in **Section 4.5.2** and therefore, increase protection from wildfire on special status wildlife species that overlap with GRSG habitat compared with Alternative A.

Impacts from Livestock Grazing and Range Management

The total number of acres open to livestock grazing would be the same as Alternative A. Under Alternative B however, the BLM would incorporate GRSG habitat objectives and considerations into all BLM grazing allotments through AMPs or permit renewals. Additional actions would include conducting land health assessments specific to achieving GRSG habitat objectives. Objectives to conserve, enhance, or restore PHMA would be developed and include wetlands and riparian areas. Grazing management actions would be included to meet seasonal GRSG habitat requirements. These management actions would protect and improve special status wildlife habitat within livestock grazing rangeland as well as riparian and wetlands habitat. Compared with Alternative A, these actions would reduce impacts from grazing described in **Section 4.5.2** on special status wildlife species.

Impacts from Travel Management

Under Alternative B, 4,141,539 acres would remain open to cross-country motorized travel and 4,498,590 acres within PHMA would be limited to existing

routes until travel management planning is complete. Actions proposed under Alternative B would reduce impacts described in **Section 4.5.2** on special status wildlife species compared with Alternative A.

Impacts from Lands and Realty Management

Under Alternative B, PHMA would be ROW exclusion areas (4,547,043 acres) and GHMA would be ROW avoidance areas (5,662,632 acres). The designation of ROW exclusion and avoidance areas would reduce habitat fragmentation to allow improved sagebrush connectivity for GRSG. These efforts would reduce impacts from permitted activities described in **Section 4.5.2** on special status wildlife species compared with Alternative A.

Impacts from Leasable Minerals Management

Management actions proposed under Alternative B would close all PHMA (4,371,643 acres) to fluid mineral leasing; 3,840,192 acres would remain open in PHMA. Approximately 1,539,752 acres of GHMA would be closed to fluid mineral leasing, the same amount as would remain closed in Alternative A. The actions under Alternative B would reduce impacts from fluid mineral leasing (see **Section 4.5.2**) described under Alternative A on special status wildlife species that inhabit PHMA.

Impacts from Locatable Minerals Management

Under Alternative B, 4,110,053 acres would be petitioned for withdrawal from locatable mineral entry. Additionally, the BLM would recommend applying best management practices in PHMA from the NTT report as COAs. Actions described under this alternative would reduce the impacts described under permitted activities in **Section 4.5.2** on special status wildlife species in PHMA compared with Alternative A.

Impacts from Mineral Materials (Salables) Management

Alternative B would close all PHMA to mineral material sales and restore defunct mineral pits to meet GRSG habitat objectives. These actions would reduce the potential impacts on special status wildlife species described in **Section 4.5.2** (permitted activities) compared with Alternative A.

Impacts from Nonenergy Leasable Minerals Management

Nonenergy leasable minerals management actions proposed under Alternative B would close PHMA to leasing; no new leases to expand would be issued. Additionally, best management practices and design features would be applied during solution mining. Compared with Alternative A, special status wildlife species within PHMA would receive increased habitat protection from these measures and reduced impacts described under permitted activities in **Section 4.5.2**.

Impacts from Mineral Split-Estate Management

Under Alternative B, where federal mineral estate occurs under non-federal surface ownerships in PHMA, the BLM would apply the same conservation

measures as would be applied on public lands. Best management practices and design features would be applied to surface developments where the surface is federally owned and the mineral estate is non-federal. These actions would reduce the potential for impacting special status wildlife species in PHMA compared with Alternative A.

Impacts from Special Designations Management

Management actions proposed under Alternative B would be the same as those in Alternative A. Management actions would not change under Alternative B and, therefore, there would be no new impacts on special status wildlife species.

Impacts from Air Quality and Climate Change Management

Under Alternative B, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative B.

4.5.6 Alternative C

Impacts from Special Status Species—GRSG Management

Proposed management actions under Alternative C would designate the same acreage of PHMA (4,547,043 acres) and GHMA (5,662,632 acres) as Alternative B except that a zero percent disturbance cap would be applied. As a result, under Alternative C, special status wildlife species and their habitat would receive more protection than under both Alternative A and Alternative B.

Impacts from Vegetation Management

Under Alternative C, vegetation management actions would be similar to those described under Alternative A. However, actions proposed under Alternative C to restore riparian and meadow vegetation by removing livestock watering infrastructure (troughs, pipelines, and wells) could reduce the availability of water for special status wildlife species compared with Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative C, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative A.

Impacts from Wildland Fire Management

Wildland fire management under Alternative C would impact special status wildlife species the same as described under Alternative A.

Impacts from Livestock Grazing and Range Management

All occupied GRSG habitat would be closed to grazing under Alternative C, and there would be zero AUMs available. Potential impacts on special status wildlife

from proper and improper grazing management described under changes to habitat conditions in **Section 4.5.2** would be avoided. However, the elimination of livestock grazing may increase the potential for large and severe wildfires as fuel loads increased in the absence of managed grazing. Therefore, impacts on special status wildlife species under Alternative C would increase compared with Alternatives A and B. This is especially true for Alternative B, under which GRSG habitat objectives and considerations would be considered in managing grazing allotments.

Impacts from Travel Management

Under Alternative C, 1,202,694 acres would be open to cross-country travel, which is a reduction compared with Alternatives A and B. No PHMA would be open to cross-country travel, which is the same as Alternative B. Additionally, 10,937,171 acres would be open to motorized travel on existing roads, with additional seasonal restrictions, which is an increase over Alternatives A and B. Therefore, impacts on special status wildlife species from travel management actions under Alternative C would be less than those described under Alternatives A and B.

Impacts from Lands and Realty Management

Management proposed under Alternative C would prohibit transmission corridor, ROW corridor, and tower construction in all GRSG habitat including PHMA and GHMA. New corridors or infrastructure would be located outside of GRSG habitat. These actions would reduce impacts from permitted activities as described in **Section 4.5.2** on special status wildlife; however, special status species that inhabit areas outside of sagebrush ecosystems could receive more impacts from development in ROWs in non-GRSG habitat.

Impacts from Leasable Minerals Management

Under Alternative C, all occupied habitat would be closed to fluid mineral leasing. Management actions proposed under Alternative C would result in an increase of 4,481,900 acres of GHMA closed to leasing compared with Alternatives A and B. Therefore, Alternative C would provide the greatest amount of habitat protection for sagebrush-obligate special status wildlife species from leasable mineral development compared with all alternatives.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative C would be similar to those described under Alternative A; however, under Alternative C an additional 4,757,517 acres of PHMA would be recommended for withdrawal from locatable mineral entry.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative C would be reduced, compared with impacts under Alternative A and B. Under Alternative C, additional GHMA would be closed to

mineral materials disposal, and PHMA and GHMA would not be open for consideration for mineral materials disposal.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative C would be reduced, compared with impacts under Alternatives A and B. Under Alternative C, additional GHMA would be closed to nonenergy solid leasable mineral exploration and development, and PHMA and GHMA would not be open for consideration of nonenergy solid leasable mineral exploration or development.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative C would be the same as those described under Alternative A.

Impacts from Special Designations Management

Under Alternative C, all PHMA would be designated as new ACECs for GRSG conservation and habitat protection. These efforts would increase habitat quality and reduce impacts on special status wildlife species in PHMA as described in changes to habitat conditions (see **Section 4.5.2**).

Impacts from Air Quality and Climate Change Management

Under Alternative C, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative C.

4.5.7 Alternative D

Impacts from Special Status Species—GRSG Management

Impacts on special status wildlife species as a result of management actions proposed under Alternative D would be similar to the impacts described under Alternative B.

Impacts from Vegetation Management

Under Alternative D, vegetation management would prioritize restoration opportunity areas, throughout all occupied habitat. Restoration opportunity areas are a subset of GRSG strategic areas that, if restored, can provide increased habitat quality and increased habitat connectivity for GRSG, as described in **Chapter 2**. These actions would increase special status wildlife habitat quality and protection relative to Alternative A.

Impacts from Wild Horse and Burro Management

Under Alternative D, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative B.

Impacts from Wildland Fire Management

Alternative D provides the most comprehensive wildland fire management direction of all the alternatives. Wildland fire management under Alternative D would increase the focus of implementing protection for multiple resources including GRSG habitat. These efforts would reduce the impacts from wildfire described in **Section 4.5.2** on special status wildlife species.

Impacts from Livestock Grazing and Range Management

Management actions proposed under Alternative D would result in 12,183,315 acres available for livestock grazing, a reduction of over 75,000 acres relative to Alternative A. Also, Alternative D provides more comprehensive livestock grazing and range management actions aimed at protecting and restoring GRSG habitat compared Alternative A. Therefore Alternative D would reduce impacts described in changes to habitat conditions in **Section 4.5.2** on special status wildlife compared with Alternative A.

Impacts from Travel Management

Under Alternative D, impacts on special status wildlife species from travel management actions would be similar to those described under Alternative B.

Impacts from Lands and Realty Management

Under Alternative D, lands and realty management actions would continue to manage current BLM ROWs in PHMA as exclusion areas. The remaining PHMA (4,289,889 acres) would be managed as avoidance areas. GHMA under Alternative D would be open to new ROWs and would require the local BLM wildlife biologist, in cooperation with ODFW, to conduct a field evaluation to determine if the proposal would impact occupied, suitable, or potential habitat for GRSG. Additionally, development within avoidance areas would be allowed but subject to a 3 percent disturbance cap for human disturbance activities. Management actions proposed under Alternative D would be more protective of special status wildlife species within GRSG habitat compared with Alternative A; however, not as protective as Alternative B.

Impacts from Leasable Minerals Management

Under Alternative D, leasable minerals management would result in the same number of acres open and closed as Alternative A. However, Alternative D would impose a 3 percent disturbance limitation and an authorization to limit impacts from permitted activities (**Section 4.5.2**) on GRSG. Therefore, special status wildlife species that occupy GRSG habitat would receive an increased level of habitat protection under Alternative D than Alternative A.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative D would be the same as those described under Alternative A. Alternative D would include more protective considerations for GRSG and their habitat that could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative D would be the same as those described under Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative D would be the same as those described under Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative D would be the same as those described under Alternative B.

Impacts from Special Designations Management

Under Alternative D, the management plans for existing ACECs and RNAs in the planning area would be revised and updated to improve the management for GRSG and sagebrush habitat. Compared with Alternative C, only 20 percent of PHMA and/or 50 percent of GHMA GRSG habitat would be managed for GRSG. Therefore, impacts on special status wildlife species would be less than those as a result of Alternative A but greater than those described under Alternative C.

Impacts from Air Quality and Climate Change Management

Under Alternative D, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Under Alternative D, the BLM would coordinate with the USFWS, ODFW, Oregon State Department of Agriculture, Oregon Biodiversity Information Center, and other organizations on the conservation efforts for special status species. Direction provided under Alternative D would include tools for establishing and assessing objectives for monitoring special status species populations. Compared with Alternative A, these measures would improve habitat within special status plant communities and increase the habitat quality for special status wildlife that could occur in those habitats.

4.5.8 Alternative E

Impacts from Special Status Species—GRSG Management

Management actions proposed under Alternative E would include a zero percent disturbance cap applied in Core Area habitats; however, the disturbance threshold would not be implemented in non-GRSG habitat. Habitat improvements in Low Density habitat (3,923,539 acres) under Alternative E would provide 1,739,093 fewer acres of protection for special status wildlife habitat in these areas compared with Alternative A.

Impacts from Vegetation Management

Under Alternative E, vegetation management actions would recommend planting alfalfa within expansive sagebrush areas but would recommend avoiding the conversion of GRSG habitat on public lands solely for increasing livestock forage. Vegetation treatments would not occur during sensitive GRSG nesting and brood-rearing periods. Alternative E would also recommend using native seed sources for habitat restoration activities and provide increased protection for resilient sagebrush habitats in Core Area habitat. Water development for livestock would be added or relocated to maintain or improve GRSG habitat. The actions proposed under Alternative E would reduce impacts on special status wildlife described in **Section 4.5.2** compared with Alternative A. In addition, compared with the other action alternatives, Alternative E would increase the availability of water in GRSG habitat which would increase habitat quality for special status wildlife in those areas including riparian and aquatic species.

Impacts from Wild Horse and Burro Management

Under Alternative D, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative A with slightly more considerations given for the protection of GRSG habitat.

Impacts from Wildland Fire Management

Under Alternative E, impacts on special status wildlife from wildland fire management would be similar to those described under Alternative D with less focused protection directions. These actions would reduce the impacts described in **Section 4.5.2** on special status wildlife species compared with Alternative A but to a lesser degree than Alternative D.

Impacts from Livestock Grazing and Range Management

Impacts on special status wildlife species from livestock grazing management proposed under Alternative E would be similar to those described under Alternative A. However, Alternative E would provide more management flexibility in assessing and correcting impacts from overgrazing of livestock to improve habitat quality. Special status wildlife habitat in these areas would increase in quality and be more protected under Alternative E compared with

Alternative A; however, management actions would not be as comprehensive as those described under Alternative D.

Impacts from Travel Management

Under Alternative E, impacts on special status wildlife species from travel management actions would be similar to those described under Alternative B.

Impacts from Lands and Realty Management

Lands and realty management actions under Alternative E would include all Core Area habitat (4,547,043 acres) as ROW exclusion areas. The actions proposed under Alternative E would be more protective of special status wildlife species within GRSG habitat compared with Alternative A; and more protective than Alternative B.

Impacts from Leasable Minerals Management

Under Alternative E, impacts from leasable minerals management on special status wildlife species would be similar to Alternative B.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative E would be the same as those described under the Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative E would be the same as those described under Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative E would be the same as those described under Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative E would be the same as those described under Alternative B.

Impacts from Special Designations Management

Under Alternative E, 715,048 acres of GRSG habitat would continue to be managed as an ACEC as described under Alternative A. Therefore, impacts on special status wildlife species would be similar to those described under Alternative A.

Impacts from Air Quality and Climate Change Management

Under Alternative E, climate change forecasting would be included in vegetation management of sagebrush and reduce impacts on special status wildlife species over the long term compared with Alternative A.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative E.

4.5.9 Alternative F***Impacts from Special Status Species—GRSG Management***

Impacts on special status wildlife species as a result of management actions proposed under Alternative F would be similar to the impacts described under Alternative B.

Impacts from Vegetation Management

Under Alternative F, vegetation management actions would result in similar impacts on special status wildlife as those described under Alternative B.

Impacts from Wild Horse and Burro Management

Under Alternative F, management of wild horses and burros would continue to provide 2,657,537 acres of HMAs. This would be the same number of HMA acres as Alternative A except that wild horse AMLs would be reduced by 25 percent for HMAs that contain PHMA and GHMA to reduce grazing pressure on vegetation. Therefore, the actions proposed under Alternative F would result in more available habitat and forage for special status wildlife species that rely on wild horse and burro ranges than all of the action alternatives.

Impacts from Wildland Fire Management

Alternative F would provide less direction for controlling invasive plants and resting recently treated vegetation areas from livestock grazing areas compared with Alternative B. These actions would reduce the impacts described in **Section 4.5.2** on special status wildlife species compared with Alternative A but to a lesser degree than Alternative B.

Impacts from Livestock Grazing and Range Management

Alternative F would close 25 percent of PHMA and GHMA to livestock grazing. These actions would reduce impacts from livestock grazing on special status wildlife habitat described in **Section 4.5.2** compared with all alternatives except Alternative C.

Impacts from Travel Management

Under Alternative F, new roads would not be constructed within 4 miles of a lek in PHMA and therefore would increase habitat protection for special status wildlife species that occupy those areas compared with Alternative B.

Impacts from Lands and Realty Management

Impacts on special status wildlife species from lands and realty management actions under Alternative F would be similar to those described under Alternative B.

Impacts from Leasable Minerals Management

Under Alternative F, 4,371,643 acres of PHMA would be closed to fluid mineral leasing (the same as Alternative B) and 5,371,643 acres of GHMA would also be closed to leasing (the same as Alternative C). No fluid mineral leasing would be allowed in GRSG occupied habitat similar to Alternative C. Impacts from leasable minerals management on special status wildlife species would close the greatest amount of occupied habitat of all the alternatives. Therefore, Alternative F would provide the most habitat protection for all special status wildlife species that overlap with GRSG habitat.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management proposed under Alternative F would be the same as those described under the Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management proposed under Alternative F would be the same as those described under Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management proposed under Alternative F would be the same as those described under Alternative B.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management proposed under Alternative F would be the same as those described under Alternative B.

Impacts from Special Designations Management

The designation of 17 ACECs to conserve GRSG and their habitat under Alternative F would provide the second-most total acres of protection for GRSG and their habitat compared with Alternative C. Therefore, impacts on special status wildlife species under Alternative F would be greater than those described under Alternative C.

Impacts from Air Quality and Climate Change Management

Under Alternative F, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Special status wildlife species habitat would not be impacted under special status plants management actions proposed under Alternative F.

4.5.10 Proposed Plan***Impacts from Special Status Species—GRSG Management***

Under the Proposed Plan, 4,589,568 acres of PHMA (1,929,580 acres of which occurs in SFA) and 5,628,628 acres of GHMA would be designated. PHMA in SFA would provide additional protections for special status wildlife species due to more restrictive management in these areas for GRSG. SFA would also be recommended for mineral withdrawal. In addition to the 3 percent human disturbance cap, the Proposed Plan would implement a cap on the density of energy and mining facilities in GRSG habitat, as described in **Appendix I**. Finally, the Proposed Plan would incorporate adaptive management, regional mitigation, buffers, and seasonal restrictions. These would offer incidental protection to special status wildlife species by avoiding direct disturbance, maintaining or restoring habitat, and limiting habitat disturbance for GRSG. Impacts from GRSG management on special status wildlife species described in **Section 4.5.2, *Nature and Type of Effects***, would be lessened under the Proposed Plan, relative to the other action alternatives.

Impacts from Vegetation Management

Under the Proposed Plan, vegetation management actions would aim to achieve certain vegetation objectives to improve GRSG habitat (See **Table 2-5**). Additionally, a comprehensive strategy for vegetation management with respect to wildland fire management would be implemented (see also *Impacts from Wildland Fire Management* below). Potential vegetation management would include proactive measures such as fuels management (e.g., conifer removal), which may result in short-term or direct impacts on special status species that use these habitats. However, the long-term benefit to special status wildlife species through habitat improvement would represent a net beneficial impact as a result of vegetation management under the Proposed Plan.

Impacts from Wild Horse and Burro Management

Under the Proposed Plan, management of wild horses and burros would result in impacts on special status wildlife species similar to those described under Alternative D. However, the Proposed Plan includes approximately 7,500 more HMA acres in PHMA and 8,000 fewer HMA acres in GHMA than Alternative D. These additional areas of PHMA would be managed to AML, increasing areas under both Alternative D and Alternative A under vegetation management standards. This would provide an incremental increase in habitat quality for special status wildlife species that occupy GRSG habitat.

Impacts from Wildland Fire Management

Under the Proposed Plan, wildland fire management would result in impacts on special status wildlife species similar to those described under Alternative D. However, under the Proposed Plan, a comprehensive strategy for wildland fire management would be implemented (see also *Impacts from Vegetation Management*, above). The GRSG Wildfire, Invasive Annual Grasses and Conifer Expansion Assessment would identify priority habitat areas and management strategies to reduce the threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would include proactive measures, such as fuels management and habitat restoration and recovery, and reactive measures, such as fire operations and post-fire rehabilitation. These efforts would reduce the impacts from wildfire described in **Section 4.5.2** on special status wildlife species, relative to Alternative D.

Impacts from Livestock Grazing and Range Management

Management actions under the Proposed Plan would result in 12,232,499 acres available for livestock grazing. This is a slightly higher amount than Alternative D (12,183,315 acres) and is slightly lower than Alternative A (12,258,337 acres). Alternative D provides more comprehensive livestock grazing and range management actions aimed at protecting and restoring GRSG habitat compared with Alternative A, and impacts under the Proposed Plan would be similar to those under Alternative D. Therefore the Proposed Plan would reduce impacts described in changes to habitat conditions in **Section 4.5.2** on special status wildlife, compared with Alternative A.

Impacts from Travel Management

Under the Proposed Plan, approximately 1,202,682 acres would remain open to unrestricted cross-country motorized travel, representing fewer acres open than all alternatives except Alternative C (1,202,694 acres). Under the Proposed Plan, more acres would be closed to cross-country motorized travel, including in PHMA (82,726 acres) and GHMA (144,931 acres) than under all other alternatives. Similarly, the Proposed Plan would place more acres under limited restrictions, including in PHMA (4,506,296 acres) and GHMA (5,481,426), allowing travel on existing roads with additional seasonal restrictions. Impacts from applying lek buffers, the human disturbance cap, and RDFs and BMPs would also provide beneficial impacts on special status species due to reduction of disturbance and habitat loss. Additional regional mitigations for GRSG habitat loss and degradation included in the Proposed Plan would provide additional benefit to habitat quality. Therefore, the Proposed Plan would reduce impacts on special status wildlife species as a result of cross-country motorized vehicle use described in **Section 4.5.2**, relative to the other alternatives.

Impacts from Lands and Realty Management

Under the Proposed Plan, impacts from lands and realty management would be similar to those described under Alternative D. However, under the Proposed Plan, approximately 3,021,993 acres of GRSG habitat would be ROW exclusion

areas, and approximately 7,935,975 acres would be ROW avoidance areas for wind and solar energy. RDFs and BMPs would be applied to further reduce impacts. Management actions under the Proposed Plan would be more protective of special status wildlife species within GRSG habitat compared with Alternative A; however, not as protective as Alternative B.

Impacts from Leasable Minerals Management

Under the Proposed Plan, leasable minerals management would result in the same number of acres closed to fluid mineral leasing and open to leasing subject to standard terms and conditions as Alternative D. A similar number of acres would be open subject to NSO (454,180 additional acres under the Proposed Plan) and CSU (454,180 additional acres under Alternative D). However, additional actions in the Proposed Plan would include recommending SFA for withdrawal, subject to valid existing rights, and incorporating measures including the human disturbance cap, RDFs, BMPs, and additional regional mitigations that would increase the level of habitat protection for special status wildlife species that occupy GRSG habitat. Therefore, the Proposed Plan would reduce impacts on special status species from leasable minerals management relative to Alternative D.

Impacts from Locatable Minerals Management

Impacts on special status wildlife species from locatable minerals management under the Proposed Plan would be similar to those described under Alternative D. However, under the Proposed Plan, SFA would be recommended for withdrawal, subject to valid existing rights. Incorporation of measures, including the human disturbance cap, RDFs, BMPs, and additional regional mitigations, would increase the level of habitat protection for special status wildlife species that occupy GRSG habitat. The Proposed Plan would include the most protective considerations for GRSG and their habitat, which could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Mineral Materials (Salables) Management

Impacts on special status wildlife species from mineral materials management under the Proposed Plan would be similar to those described under Alternative D. However, the Proposed Plan includes additional measures, including RDFs, BMPs, and regional mitigations to protect and restore GRSG and its habitat. The Proposed Plan would include the most protective considerations for GRSG and their habitat, which could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Nonenergy Leasable Minerals Management

Impacts on special status wildlife species from nonenergy leasable minerals management under the Proposed Plan would be similar to those described under Alternative D. However, the Proposed Plan includes additional measures including RDFs, BMPs, disturbance cap, and regional mitigations to protect and restore GRSG and its habitat. The Proposed Plan would include the most

protective considerations for GRSB and their habitat that could also increase protection for special status wildlife in sagebrush ecosystems.

Impacts from Mineral Split-Estate Management

Impacts on special status wildlife species from mineral split-estate management under the Proposed Plan would be the same as those described under Alternative D.

Impacts from Special Designations Management

Impacts on special status wildlife species from special designations management under the Proposed Plan would be similar as those described under Alternative D.

Impacts from Air Quality and Climate Change Management

Under the Proposed Plan, no impacts on special status wildlife species from air quality and climate change management are expected.

Impacts from Special Status Plants Management

Impacts on special status wildlife species from special status plants management under the Proposed Plan would be the same as those described under Alternative D.

4.6 WILD HORSES AND BURROS

4.6.1 Methods and Assumptions

Indicators

Indicators of impacts on wild horses and burros are as follows:

- Changes in Acres available
- Changes in allocated AMLs
- Changes in funding or resources available for management

Sources of indicators of land health status include Standards for Rangeland Health, ESI data, NRCS Soil Survey Geographic Database (SSURGO) Soil-Vegetation Inventory Method (SVIM), which is the predecessor to ESI. These sources provide the data to describe a site's vegetation and soil conditions and the potential for sagebrush to occupy the site. The sources also supply images of the current status of sagebrush on a site.

Assumptions

The analysis includes the following assumptions:

- Horses and burros depend on the herbaceous component of a shrub and grass plant community for forage. An increase in shrubs or encroachment of conifers in these communities can decrease

grasses and forbs. Vegetation treatments, such as prescribed burns or invasive plant control, can enhance the plant community composition and forage availability.

- Although the BLM cannot control when or how much wild horses and burros graze certain areas, heavy or poorly timed wild horse and burro grazing may adversely affect plant composition, plant succession, and ground cover.
- Water is the primary resource associated with wild horse distribution. Water developments can be used to improve wild horse distribution. However, water developments that employ some type of mechanical device, such as a windmill or electric pump, can fail and cause horses to go without or to search elsewhere for water.
- Fences and other structures can restrict wild horse movement and access. Fences are sometimes necessary to restrict horse access to areas inside HMAs or to protect sensitive resources within HMAs.
- While wild horses and burros may be found on lands outside HMAs, these areas have no forage allocated to wild horses and burros. The BLM has no authority to manage wild horses and burros outside of HMAs, except to remove them.
- The scheduling for wild horse and burro gathers is influenced by a national priority process. Factors affecting gather priorities include determinations of excess horses and overpopulations, wild horse and range condition, annual appropriations, litigation and court orders, emergency situations, such as disease, weather, and fire, availability of contractors, the market for adoption, and long-term holding availability for unadoptable excess horses. The principal factor affecting gather priorities is that short- and long-term holding facilities are at or near capacity, significantly reducing the number of excess wild horses and burros that can be removed from HMAs.
- Population growth suppression (fertility control agents, sterilization, and sex ratio adjustments) can aid in population control, but periodic gathers are still necessary to remove excess wild horses.
- Wild horse and burro distribution varies by season, climatic conditions, water and forage availability, and population size.
- Intensive livestock grazing management strategies (scheduled pasture rotations) that involve fences are generally not appropriate for long-term wild horse management.

4.6.2 Nature and Type of Effects

All HMAs are managed for AML. Initially, AML is established in RMPs at the outset of planning and is adjusted based on monitoring data through revision of HMAPs and subsequent LUPA. Priorities for gathering excess wild horses and

burros to maintain AML are based on population inventories, resource monitoring objectives, gather schedules, and budgets. Gathers are conducted to maintain AML, for emergency situations due to lack of forage, water or for other human health and safety reasons,

Implementing management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that could reduce forage and water availability or disturb a wild horse and burro population. For example, mineral extraction, recreation, and construction within ROW grants may result in any of the following:

- Reduce forage availability
- Disturb horses or burros
- Prohibit the ability of wild horses or burros to move freely across HMAs
- Limit ability to perform management activities (for example, energy development infrastructure may impact the ability to conduct helicopter gathers)

Limiting development from these activities to protect GRSG would also protect forage for wild horses and burros and would limit human and surface disturbance.

There could also be impacts on wild horses and burros and the ability to support AMLs when management options for HMAs are restricted. For example, establishment of priority for gather operations in PHMA could put HMAs that do not contain PHMA at risk for overpopulation. Impacts from range improvement restrictions would generally vary based on type of range improvement affected. Restrictions on fences would improve wild horse habitat by allowing free range, while limiting projects that could enhance forage and water availability would not help to support the AML.

Implementing management for the following resources would have negligible or no impact on wild horse and burro management and are therefore not discussed in detail: air quality, visual resources, cultural resources, wilderness characteristics, ACECs, socioeconomics, and tribal interests.

4.6.3 Impacts Common to All Alternatives

Across all alternatives, there would be no direct change to acres managed for wild horses and burros as HMAs. For the planning area as a whole, there are approximately 2,657,537 acres of HMAs, with approximately 808,316 overlapping PHMA and 1,554,165 acres overlapping GHMA.

Impacts from Energy and Minerals Management

As described below, for many energy and mineral resources (i.e., leasable minerals and nonenergy leasables), current development is minimal and future

development levels are predicted to remain low. As a result, impacts on wild horses and burros management would be negligible across all alternatives. For locatable minerals, resource potential is unknown. Although some level of development may occur in the future, impacts on wild horses and burros are likely to be minimal.

Impacts from Leasable Minerals Management

While there is a potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for reasonably foreseeable development is low; therefore, impacts on wild horses and burros from development would be limited, independent of the area available for leasing or stipulations applied.

Impacts from Locatable Minerals Management

All locatable minerals have the potential to exist within the planning area, but exploration has been minimal and potential is unknown across all alternatives.

Impacts from Nonenergy Leasable Minerals Management

Because mineral potential reports are not completed and there is currently no commercial interest in solid leasables, the potential is unknown. Impacts on wild horses and burros are likely to be minimal across all Alternatives.

Impacts from Mineral Split-Estate Management

Wild horse and burro HMAs occur only on public lands; therefore, impacts on from split-estate minerals would be negligible.

4.6.4 Alternative A

Impacts from Vegetation Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Wild Horse and Burro Management

Within the sub-region, all BLM field offices manage for wild horses and burros within established HMAs within AML. All HMAs contain GRSG habitat within a sagebrush vegetation community. Overall management direction is to manage for healthy populations of wild horses and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other **multiple uses**.

Prioritizing wild horse and burro gathers to maintain AML is not based on GRSG habitat needs; nevertheless, this is implicit in the congressional directive to maintain a thriving natural ecological balance.

Evaluation of AMLs and completing land health assessments may result in the need to reduce wild horse and burro populations in an HMA as well as outside

its boundaries in order to achieve GRSG habitat needs. Restricting removal and population control techniques could hamper proper management.

Impacts from Wildland Fire Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Livestock Grazing and Range Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Recreation Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Travel Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Lands and Realty Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

Impacts from Mineral Materials (Salables) Management

Under Alternative A, the impacts on wild horse and burro management continue to be the same as those identified in the individual RMP documents.

4.6.5 Alternative B

Impacts from Vegetation Management

Management prescriptions to conserve, enhance, or restore riparian areas and wet meadows in GRSG habitat could also improve forage conditions and water quality for wild horses and burros. However, when management requires increased fences to protect vegetation for GRSG, this could limit wild horse and burro access to riparian areas and reduce water availability. This could result in a change in horse distribution and potential need for reduction of wild horse and burro numbers within an HMA in the long term in order to meet vegetation objectives for GRSG.

Restoration projects in priority habitat would be designed to benefit GRSG and, based on the likelihood of success, with reestablishment of sagebrush cover as the highest priority. Projects to remove nonnative species and improve habitat could also improve rangeland health and forage conditions for wild horses and burros in the long term; however, value of forage for wild horses and burros would depend on the species replacing nonnatives. In the short term, vegetation treatments may result in site-specific reduction in available forage.

Impacts from Wild Horse and Burro Management

Developing or amending HMAPs to incorporate GRSG habitat objectives and management considerations, prioritizing the evaluation of AMLs in PHMA, and completing land health assessments could reduce wild horse and burro AMLs in PHMA to achieve GRSG habitat objectives. Prioritizing wild horse and burro gathers in HMAs that overlap PHMA can reduce the funding for or the ability to manage populations on HMAs outside of PHMA, although removals would be allowed in other areas, if necessary to prevent catastrophic environmental issues. Modifying, relocating, or developing alternative watering sites to conserve GRSG habitat could impact horses that are habituated to particular watering sites and may not adjust to new sites. Restricting removal and population control techniques could hamper proper management.

Authorization of new or modification of existing livestock watering sites that benefit or conserve PHMA and GHMA would be expected to benefit wild horses and burros. Eliminating or fencing water sources that may be identified as impacting PHMA and GHMA could reduce or eliminate water availability, resulting in a change in horse distribution and potential need for reduction of wild horse and burro numbers in an HMA. In addition, without the availability of water, horses and burros would be expected to move outside HMAs, increasing the cost of gathers for removing nuisance animals outside HMAs or that occupy private land.

Impacts from Wildland Fire Management

Fuels projects and fire suppression to protect sagebrush ecosystems and associated PHMA would benefit wild horses and burros where HMAs overlap due to a reduction in the likelihood of high intensity wildfire. However, temporary or long-term management changes to wild horses and burros, such as reduction in AML, removals, movement patterns, and forage access, may be necessary to achieve and maintain the desired project objectives. This would reduce management options for wild horse and burro management and consequently increase the costs of management.

Impacts from Livestock Grazing and Range Management

Management to conserve, enhance, or restore GRSG habitat and that benefit livestock would also benefit wild horses and burros within GRSG in the long term. Modifying or eliminating livestock watering sites would reduce water availability or impact horses that are habituated to existing watering sites and may not adjust to new sites. This could result in a change in horse distribution and the need to reduce wild horse and burro numbers or develop alternative water sources within specific HMAs.

Impacts from Recreation Management

Under Alternative B, limits on SRPs in PHMA may reduce any conflicts between large recreation groups and wild horse and burro management. Other conflicts with recreation would remain as discussed under *Nature and Type of Effects*.

Impacts from Travel Management

Under Alternative B, limits to motorized travel in PHMA would decrease any disturbance of horses and burros from OHV use. Administrative access for gathers would be retained; however, closures or reduced maintenance on routes during comprehensive travel management planning would have the potential to impact time, costs, and efficiency of gathers.

Impacts from Lands and Realty Management

Implementation of exclusion and avoidance actions to maintain priority GRSG habitat would reduce devolvement in these HMAs overlapping PHMA. This would indirectly reduce related disturbance to wild horses and burros, as discussed under *Nature and Type of Effects*.

Impacts from Mineral Materials (Salable) Management

Under Alternative B, PHMA would be closed to mineral materials development. As a result, the chance of development disturbing wild horses and burros from mineral development would be decreased in this area. However, it should be noted that in many cases in the planning area, mineral material extraction sites are small in size and result in minimal impacts on wild horses and burros.

4.6.6 Alternative C***Impacts from Vegetation Management***

Restoration proposed under Alternative C includes removing livestock water developments. This would reduce available water in HMAs. It also would change horse distribution and the need to reduce wild horse and burro AMLs in HMAs. This would apply to occupied habitat where no alternative source of water were available, unless water developments were maintained specifically for wild horses and burros. Restoration would also include areas with crested wheatgrass seedings. This could result in short-term loss of forage for wild horses and burros in site-specific areas. In the long term, replacement with native vegetation could impact available forage, depending on species included and the forage value of these species for wild horses, as compared with crested wheatgrass.

Other vegetation management would be similar to current conditions, as dictated in existing RMPs.

Impacts from Wild Horse and Burro Management

Impacts are as discussed under Alternative A.

Impacts from Wildland Fire Management

Impacts are similar to those discussed under Alternative A.

Impacts from Livestock Grazing and Range Management

Eliminating livestock grazing in occupied habitat would provide additional forage for wild horses and burros where HMAs overlap these habitats. This would

occur by reducing competition for forage. Due to the lack of authorized grazing, no new water developments would be created, limiting wild horse and burro use of water to existing developments. Eliminating livestock watering sites could reduce water availability. This could change horse distribution and the potential need for reducing wild horse and burro numbers in an HMA.

Impacts from Recreation Management

Impacts are as discussed under Alternative A.

Impacts from Travel Management

Impacts are as discussed under Alternative A.

Impacts from Lands and Realty Management

Under Alternative C, new transmission corridors and ROWs for corridors would be prohibited. As a result, disturbance from development and related impacts on wild horses and burros management would be reduced compared with Alternative A.

Impacts from Mineral Materials (Salables) Management

Impacts from mineral materials are as described under Alternative A.

4.6.7 Alternative D

Impacts from Vegetation Management

Under Alternative D, PHMA and GHMA would be prioritized for restoration. Alternative D would emphasize Restoration Opportunity Areas Management for wild horses and burros most likely to be impacted in HMAs that overlap these areas. These areas are South Steen, Riddle Mountain, and portions of Kiger and Warm Springs (see **Figure 3-6**, Herd Management Areas in the Planning Area, and **Figure 2-1**, GRSG Habitat in the Planning Area).

Other portions of PHMA, GHMA, and other habitat deemed of importance for GRSG may also be treated. If wild horses and burros are found to be a factor in not meeting GRSG habitat objectives, an adjustment of AML would be assessed and implemented if warranted. Measures to prevent and reduce invasive plants in GRSG habitat would improve habitat for wild horses and burros in the long term. This would be the case if forage quality and quantity were increased. However, it could impact wild horses and burros in the short term if treatments were to affect forage or require exclusion of horses and burros from site-specific areas. Replacing annual grasses with perennial grasses may impact forage value for wild horses and burros. These impacts would vary, depending on the species of grasses selected.

Impacts from Wild Horse and Burro Management

Under Alternative D, total AML in the planning area would remain within the current range, which is similar to Alternatives A, B, and E. AML modification could occur if rangeland health analysis and monitoring data indicate that wild

horses and burros are a factor in not meeting GRSG habitat objectives. If this were found to be the case, the BLM would take appropriate action in HMAs to achieve objectives. Options to manage wild horses and burros are to control water sources, close gates, and move horses to other areas. If actions taken are not achieving objectives, AML could be adjusted.

Authorizing new or modifying existing livestock watering sites that benefit or conserve PHMA and GHMA would benefit wild horses and burros. Eliminating or fencing existing water sources that may be impacting PHMA and GHMA could reduce or eliminate water availability, resulting in a change in horse distribution and a potential need for reducing wild horse and burro numbers in an HMA. In addition, without the availability of water, horses and burros would be expected to move outside HMAs, increasing the cost of gathers for removing nuisance animals outside HMAs or that occupy private land.

Impacts from Wildland Fire Management

Under Alternative D, fire management actions would focus on a system of fuel breaks and treatment of up to 30 percent of GRSG habitat. The purpose of this would be to reduce the probability of large-scale wildfire. Wildfire suppression priorities would include all GRSG habitat types. HMAs that overlap these areas would have the risk of large-scale fires reduced. HMAs outside of priority areas, however, may have an increased risk of large-scale wildfire should resources for vegetation treatment or fire suppression not be available. Areas affected by wildland fire would be rested for at least two years or until objectives for the stabilization or restoration have been met. Should wildfire burn an entire HMA, wild horses and burros would be removed to temporary holding facilities until objectives have been met, resulting in substantial unplanned expenditures for the program.

Impacts from Livestock Grazing and Range Management

Under Alternative D, authorized grazing would be slightly reduced (12,183,315 acres open to grazing in GRSG habitat, an approximately 1 percent reduction compared with Alternative A). This would result in minimal direct impacts on wild horse and burro management, due to the lack of substance acreage or AUM change. Livestock grazing permits and leases would be processed and land health assessment would occur in Category "I" allotments most in need of habitat improvement with an emphasis on allotments in GRSG habitat, with PHMA prioritized over GHMA. As a result, range conditions for both livestock and wild horses and burros overlapping these allotments should be improved, compared with Alternative A. Range improvements, including seeps and springs, would be developed or modified to enhance functionality during periods that livestock are absent from the allotment. In addition, if water developments were to be removed for GRSG protection, new water sources would be located beforehand. As a result of these management actions, there is potential for maintained or enhanced use of water sources by horses and burros, increasing the ability to manage at or below AML.

In PHMA, forage enhancement treatments must also enhance GRSG habitat; therefore, there is a potential for reduced vegetation treatments, which benefit livestock forage. This could in turn impact forage availability for wild horses and burros. New structural range improvements would be the same as those under Alternatives B and E. Construction of new livestock facilities would be avoided within 1.2 miles of leks; supplemental feeding for livestock would also be avoided but would be authorized as needed for resource objectives, in accordance with BLM policy. Based on the trends, the use of supplemental feed is minimal and could reduce or enhance available forage by improving vegetation community composition. This would reduce available forage for wild horses and burros that may use those areas.

Impacts from Recreation Management

Changes may occur to SRPs and RUPs in PHMA in order to reduce direct and indirect disturbance to GRSG. As a result, the potential for disturbance of wild horses and burros from organized recreation groups would be similarly reduced. General disturbance from recreation would continue, as discussed under *Nature and Type of Effects*.

Impacts from Travel Management

Travel management impacts are similar to those described under Alternative B.

Impacts from Lands and Realty Management

Under Alternative D, current ROW exclusion areas would be retained in PHMA. All other GRSG habitat, including GHMA, would be managed as open for ROWs, unless already managed as avoidance or exclusion by the existing planning. All new ROWs in GHMA would require the BLM to cooperate with ODFW to determine impacts on occupied, suitable, or potential habitat, and development and associated disturbance to wild horses and burros would be avoided in occupied habitat, and minimized in suitable or potential habitat.

Impacts from Mineral Materials (Salables) Management

Impacts are the same as described under Alternative B.

4.6.8 Alternative E

Impacts from Vegetation Management

Under Alternative E, vegetation management would include the connectivity model and habitat monitoring suggested in the ODFW Plan to minimize the impacts of habitat loss and fragmentation. Should the implementation of this plan improve and maintain habitat for GRSG, habitat for wild horses and burros may also be maintained or improved. Measures to reduce invasive plant spread would improve habitat for wild horses and burros in the long term.

Impacts from Wild Horse and Burro Management

Under Alternative E, AML would remain within the current range unless monitoring data warrants a change that benefits GRSG habitat suitability, as

discussed under Alternatives A, B, and D. Under this alternative, management agencies would be strongly encouraged to prioritize funding for wild horse gathers in GRSG areas that are over AML. In the absence of additional overall funds, funding and resources for HMAs outside of GRSG habitat would be reduced. This would impact the ability to meet AMLs and manage for rangeland and herd health in these areas in the long term.

Impacts from Wildland Fire Management

Preventing fire from entering at-risk communities would be a high priority for protecting GRSG habitat under Alternative E. As a result, the risk of ignition and spread of fire in occupied GRSG habitat would be reduced, thereby reducing the impacts of fire on HMAs in GRSG habitat. The risk of fire spread in other habitat could increase, should limited resources be allocated for GRSG. Removing juniper in GRSG habitat would improve forage for wild horses and burros. An emphasis on fire suppression near leks would reduce the risk of fire spread for HMAs.

Impacts from Livestock Grazing and Range Management

Changes to livestock grazing systems under Alternative E would be made if management were to result in livestock removing forage to the point that it would be detrimental to GRSG due to decrease in cover. Impacts would be similar with changes in management under all alternatives to meet the BLM's Standards for Rangeland Health.

In the case of range improvements, water developments would be located or relocated to maintain or enhance habitat quality. Existing water improvements would be directed to maintain free-flowing nature and wet meadow characteristics. These requirements may necessitate changes to water developments that would limit the ability of wild horses and burros to use water, especially if dirt tanks or overflow ponds were removed. This may change horse distribution and AMLs in HMAs, where alternative water sources are not available. New livestock facilities would be required to meet certain characteristics, including being at least 1.2 miles from leks. These requirements may impose limits on locating developments and impact the related ability to manage wild horse and burro populations with water developments.

Impacts from Recreation Management

Under Alternative E, recreation management would be similar to that described under Alternative A, but seasonal restrictions may be imposed to limit disturbance to GRSG. Such restrictions would likely reduce disturbance to wild horses and burros also.

Impacts from Travel Management

Seasonal and site-specific limits on OHV travel in GRSG habitat would limit disturbances on wild horses and burros from other recreational users. As described in Alternative B, administrative access for gathers would be retained; however, closures or reduced maintenance on routes during comprehensive

travel management planning would have the potential to increase time and costs and decrease effectiveness of population control gathers.

Impacts from Lands and Realty Management

All PHMA would be classified as an exclusion area, decreasing the risk of development and associated disturbance to wild horses and burros, compared with Alternative A as discussed under *Nature and Type of Effects*.

Impacts from Mineral Materials (Salables) Management

Under Alternative E, no development is recommended in Core Area habitat if they occur in GRSG habitat with evidence of GRSG presence. Due to the potential for greater flexibility in the application of restrictions, some level of development and related disturbance of wild horses and burros may increase in GRSG habitat as compared with other action alternatives. However, it would be at a reduced level, as compared with Alternative A, where few restrictions are specific GRSG habitat.

4.6.9 Alternative F

Impacts from Vegetation Management

Under Alternative F, restoration would be prioritized in areas that have the most likely chance of successful restoration. Because the exact areas prioritized would be determined at implementation, comparison with other alternatives is difficult; however, emphasis on areas likely to have successful restoration would likely result in more effective vegetation treatments. Habitat for wild horses and burros could be improved as compared with Alternative A in the long term should GRSG treatments benefit forage for wild horses and burros. Meeting objectives for GRSG in occupied habitat would be the highest restoration priority. As a result, habitat improvement would most likely occur in occupied GRSG habitat.

Impacts from Wild Horse and Burro Management

Under Alternative F, proposed management would reduce AML 25 percent compared with current AMLs. As a result, costs for management, particularly related to gathers, would increase dramatically above Alternative A due to the need to conduct additional gathers and/or increase fertility control measures and to conduct NEPA associated with these site-specific actions. Available funding and national level restrictions of the wild horse and burro program (such as lack of space in long-term holding facilities) may impact the ability to achieve this objective. Location specific population reductions and impacts on particular HMAs would be determined at implementation and likely related to land health and current population size.

Other management actions and related impacts are similar in nature to those described under Alternative B.

Impacts from Wildland Fire Management

Impacts from wildland fire management are similar to those described under Alternative B. Areas affected by wildland fire would be rested for at least two years or until objectives for the stabilization or rehabilitation have been met. Closures in place for livestock grazing post-fire until woody and herbaceous cover achieve GRSG habitat objectives could result in long-term (10 to 50 years or longer) exclusion of burned sites. Should wildfire burn an entire HMA, wild horses and burros would be removed to temporary holding facilities until objectives have been met, resulting in substantial unplanned expenditures for the program. The level of impacts would depend on the location, size, and intensity of wildfire in GRSG habitat in relation to the location of HMAs.

Impacts from Livestock Grazing and Range Management

Under Alternative F, 25 percent of the PHMA and GHMA would be unavailable to grazing each year and use levels in open areas would be limited to 25 percent use of current year's growth. This would result in an approximately 62 percent reduction in AUMs. As described in Alternative C, a reduction in areas available for livestock grazing could add forage available for wild horses and burros. In addition, new water developments would be prohibited and modifications to existing developments would be required, including potentially dismantling them.

The inability to construct new water developments would restrict opportunities to provide sufficient water for wild horses and burros and to manage for AML. Alternative F also calls for avoiding all new structural range developments in occupied GRSG habitat, unless independent peer-reviewed studies show that range improvement structures benefit GRSG. In practice, this would result in few range developments being approved. The lack of new range improvements could limit opportunities for making changes in livestock grazing management, which could affect forage conditions for wild horses and burros.

Impacts from Recreation Management

Recreation management would be similar to management proposed under Alternative B. In addition, camping and other nonmotorized recreation would be prohibited within 4 miles of active GRSG leks. This would reduce potential conflicts between wild horses and burros and recreationists in these areas.

Impacts from Travel Management

Impacts from travel management are similar to Alternative B, with the addition of limitations on road construction within 4 miles of active leks in occupied GRSG habitat. As a result, any potential disturbance from roads to wild horses and burros would be reduced; however, potential access routes for wild horses and burros management, including gathers, monitoring herd health and data acquisition to support gathers may be reduced. This would increase the time and costs and decrease effectiveness of management.

Impacts from Lands and Realty Management

For Alternative F, occupied GRSG habitat areas would be exclusion areas for new ROW permits. As a result of ROW exclusion, no additional development would occur in these areas, thus reducing potential impacts on wild horses and burros.

Impacts from Mineral Materials (Salables) Management

Under Alternative F, impacts are as described under Alternative B.

4.6.10 Proposed Plan***Impacts from Vegetation Management***

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over two times more sagebrush and juniper treatments and 14 percent more invasive plant species treatments compared with Alternative A, as well as crested wheatgrass treatments. In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would decrease invasive annual grasses and reduce conifer encroachment into sagebrush. Use of site-specific analysis and tools like VDDT and the FIAT report would help refine the location for specific areas to be treated. These treatments (e.g., conifer removal) could impact forage or require exclusion of horses and burros from specific areas in the short term but would improve forage conditions in the long term.

Other portions of PHMA, GHMA, and other habitat deemed of importance for GRSG may also be treated. If wild horses and burros are found to be a factor in not meeting GRSG habitat objectives, AML would be adjusted if warranted.

Impacts from Wild Horse and Burro Management

Under the Proposed Plan, total AML in the planning area would remain within the current range. AML modification could occur if rangeland health analysis and monitoring data indicate that wild horses and burros are a factor in not meeting GRSG habitat objectives. If this is found to be the case, the BLM would take appropriate action within HMAs to move toward achieving objectives. Options to manage wild horses and burros are controlling water sources, closing gates, and moving horses to other areas. If actions taken are not moving toward achieving objectives, adjustments in AML could be applied.

Prioritizing gathers in HMAs would directly and indirectly impact wild horses and burros. The following HMAs fall within SFA: Beaty's Butte, Coyote Lake-Alvord-Tule Springs, and Jackies Butte. These HMAs would have the highest priority for gathers to retain AML. This focused management strategy would ensure that AML is maintained, along with the necessary forage for the wild horses in these HMAs; however, it may increase the number of gathers needed to maintain AML, which could increase the disturbance to the populations and could disrupt herd dynamics. Prioritization could also put HMAs that fall in the lowest priority at risk for overpopulation; however, under this LUPA, provisions

would allow for exceptions as needed for herd health-limiting impacts. The Proposed Plan when compared with Alternative A would require more intensive management, particularly within the boundaries of the SFA.

Authorizing new or modifying existing livestock watering sites that benefit or conserve PHMA and GHMA would provide alternate sources of water for wild horses and burros. Eliminating fencing or existing water sources that may be impacting PHMA and GHMA could reduce or eliminate water availability. This could result in a change in horse distribution and potential need for reducing wild horse and burro numbers in an HMA. In addition, without the availability of water, horses and burro move outside HMAs, increasing the cost of gathers for removing nuisance animals from outside HMAs or from private land.

Finally, the BLM would continue to coordinate with professionals from other federal and state agencies, researchers at universities, and others to use and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horses and burros program. This would ensure practical and efficient management of wild horses and burros in AML, while protecting GRSG habitat.

Impacts from Wildland Fire Management

The Proposed Plan, as in Alternative D, would focus on the cooperative assessment, planning, and implementation of actions to minimize the risk of severe wildfire in GRSG habitat. The Proposed Plan would require preparing a burn plan before prescribed fire in GRSG habitat and assessing management needs based on local conditions, as detailed in **Appendix H**. Potential management includes fuels management and habitat restoration and recovery, as well as fire operations and post-fire rehabilitation. These actions may result in site-specific temporary exclusions of wild horses and burros or reduced forage; however, it would help to reduce the likelihood of catastrophic wildfire and subsequent disturbance of wild horses and burros and would reduce forage in the long term, as compared with Alternative A.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan, a slight reduction would occur in authorized grazing and AUMs (less than 1 percent). This would result in minimal direct impacts on wild horse and burro management, due to the lack of substance acreage or AUM change. Livestock grazing permits and leases would be processed and land health would be assessed in Category I allotments most in need of habitat improvement. Allotments in GRSG habitat would be prioritized, with SFA prioritized over PHMA and then GHMA. As a result, range conditions for both livestock and wild horses and burros overlapping these allotments should be improved, compared with Alternative A.

Range improvements, including seeps and springs, would be developed or modified to enhance functionality when livestock are absent from the allotment. In addition, if water developments were to be removed for GRSG protection,

new water sources would be located beforehand. As a result of these management actions, there is potential for maintained or enhanced use of water sources by horses and burros, increasing the ability to manage at or below AML.

In PHMA, forage enhancement treatments must also enhance GRSG habitat; therefore, there is a potential for reduced vegetation treatments, which benefit livestock forage. This could in turn impact forage availability for wild horses and burros. New livestock facilities would be avoided within 1.2 miles of leks. Supplemental feeding for livestock would be avoided but would be authorized as needed for resource objectives, in accordance with BLM policy; this would reduce available forage for wild horses and burros that may use those areas. Based on the trends, the use of supplemental feed is minimal and could reduce or enhance available forage by improving vegetation community composition.

Impacts from Recreation Management

General disturbance from recreation would continue, as discussed under *Nature and Type of Effects*. The Proposed Plan also restricts the construction of recreation facilities unless a net conservation gain would result. Construction would require assessing SRMAs for consistency with the Adaptive Management Strategy (**Appendix D**). Restrictions would further limit disturbance to wild horses and burros from recreation.

Impacts from Travel Management

Under the Proposed Plan travel management plans would be implemented within 5 years. In those plans PHMA and GHMA would be designated as limited to existing roads unless already designed as limited or closed. Specific implementation level criteria to protect GRSG would also be applied, further limiting locating new roads and volume of traffic on new and existing roads. As a result, the disturbance of wild horses and burros from recreation traffic would be reduced, as compared with Alternative A. Under the Proposed Plan, temporary closures would also be permitted as determined necessary for resource protection, which would further reduce disturbances to wild horses and burros.

Impacts from Lands and Realty Management

Under the Proposed Plan, the greatest restrictions on ROW development would occur in the HMAs in SFA, followed by PHMA and GHMA. Under the Proposed Plan, the BLM would manage a similar amount of ROW exclusion for major and minor ROWs as Alternative A. However, 3,021,993 acres would be ROW exclusion for solar and wind ROWs. In addition PHMA and GHMA (16,312,486 acres, nearly 4.5 times more than Alternative A) would be ROW avoidance for major and minor ROWs. New ROWs would also be collocated with existing disturbances when possible. These restrictions would provide for the greatest protection of wild horse and burro forage and water sources and would limit disturbance in SFA; however, they could push development to areas outside of occupied GRSG habitat, creating increased disturbance and

harassment of wild horses and burros in HMAs that are the lowest priority of GHMA.

The Proposed Plan would also include a 3 percent cap on human disturbance. Human disturbances in PHMA and GHMA would additionally be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as RDFs and buffers (see **Appendices C and S**). As a result, indirect disturbance of wild horses and burros or their forage from other development could be reduced, as compared with Alternative A. These management actions would minimize impacts on wild horses and burros from ROW development, including direct disturbance and disturbance of forage, as compared with Alternative A. Implementing the GRSG mitigation strategy, monitoring framework, and assessment of land health standards under the Proposed Plan would ensure that this increased level of protection of forage and water resources and reduction of wild horse and burro harassment would be maintained.

Impacts from Energy and Minerals Management

Under the Proposed Plan, the greatest restrictions on development of mineral resources would occur in the HMAs in SFA, followed by PHMA and GHMA. These restrictions would provide for the greatest protection of wild horse and burro forage and water sources and would limit disturbance in SFA; however, they could push development to areas outside of occupied GRSG habitat, creating increased disturbance and harassment of wild horses and burros in HMAs that are in the lowest priority of GHMA.

The Proposed Plan would also include a 3 percent cap on human disturbance. Human disturbances in PHMA and GHMA would additionally be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as RDFs and buffers (see **Appendices C and S**). As a result, indirect disturbance of wild horses and burros and their forage from other development could be reduced, as compared with Alternative A. These management actions would minimize impacts on wild horses and burros from energy and minerals development, including direct disturbance and disturbance of forage, as compared with Alternative A. Implementing the GRSG mitigation strategy, monitoring framework, and hard trigger adaptive management responses under the Proposed Plan would ensure that this increased level of protection of forage and water resources and reduction of wild horse and burro harassment would be maintained.

Impacts from Mineral Materials (Salables) Management

Impacts would be similar to those described under Alternative B.

4.7 WILDLAND FIRE MANAGEMENT

4.7.1 Methods and Assumptions

Indicators

Indicators of impacts on wildland fire management are as follows. Details for each of these factors is included in the current conditions discussion in **Section 3.6**:

- Alteration of vegetation cover or composition that is likely to result in a shift in fire regime condition class (FRCC)
- A change in the likelihood of human-caused wildfire in the planning area
- A change in the size, extent, or occurrence of wildfire in the planning area
- Changes in the response to wildfire or appropriate treatments to prevent wildfire

Assumptions

The analysis includes the following assumptions:

- Fire is an essential, functional, natural disturbance in many of the ecological systems found in the planning area.
- A direct relationship exists between fuel characteristics and potential fire intensity and severity.
- The necessity for fuels treatments would likely continue over the life of this plan.
- There will be increased demand on suppression resources for managing wildfires in order to protect values at risk.
- BLM will implement mitigation efforts through Industrial Fire Protection Levels (IFPL) and other prevention and education activities.

4.7.2 Nature and Type of Effects

Impacts on wildland fire management are generally the result of the following:

- Activities that alter vegetation cover or composition, including wildfire response
- The ability to respond to wildfires or to implement appropriate treatment methods to manage wildfire
- Impacts from human-caused wildfires

Key types of impacts are detailed below. As discussed in Section 3.6, Wildland Fire Management, there has been a number of wildfires in GRS habitat.

There is a high probability for wildfires in GRS habitat in the future. During the 2012 fire season nearly one million acres burned, most of which was in designated PPH. Section 3.6 also states that most of the lands in the planning area have a moderate to high level of departure from historical conditions and related wildfire risk. Actions that change the condition class from highly altered ecosystems (FRCC 3) to one closer to historical conditions (FRCC 1 or 2) could reduce the risk of losing key ecosystems and could decrease wildfire risk.

Various resource uses may introduce additional ignition sources into the planning area. These sources increase the probability of wildfire and the need for fire prevention. Fire intensity can be affected by activities that decrease fuel loading and alter fuel arrangement, such as vegetation treatments and activities that alter the composition and structure of vegetation communities.

Characteristics of individual fire events as well as the collective fire regime are important drivers of structure, composition, and abundance of vegetation within sagebrush communities (Miller et al. 2011). Individual fires are described by severity (the level of biological and physical effect of fire on all plant layers, soils, and animals), intensity (the amount of energy released during a fire), season, extent or size, and complexity (patchiness of burned and unburned areas within the fire boundary). Fire regime is a function of the mean and range of the interval (usually in years) between fire events for a defined area. The fire regime for a specific area is influenced by climate, regional location, fuel characteristics (biomass and structure), recovery time following disturbance, topography, season and frequency of ignition, and vegetation composition (Miller et al. 2011).

Transportation and travel management can impact fire occurrence by changing the probability of human-caused fires. The risk of ignition increases where travel is less restrictive, particularly where motorized vehicles travel cross-country. All forms of travel encourage the spread of invasive plant species (CEC 2012), particularly cheatgrass. This can shift fire regimes and increase fire behavior potential, size, extent, and occurrence. If management restricts access, wildfire risk may be decreased and a trend toward historic conditions may occur. Yet, transportation management may impact fire management activities; when routes are closed and rehabilitated, they become unavailable for response to wildfires, limiting access for firefighters.

Similarly, the level and type of recreation permitted can impact wildfire risk. Increased recreation may increase the probability of unintentional fire starts and the need for fire suppression. Threats from recreation and recreation management are addressed under Travel Management (**Table 2-1**), therefore, recreation is not addressed as a separate topic in this section. Lands and realty actions may indirectly result in development and associated fire risk. For example, issuing ROWs can result in indirect impacts by increasing the

probability of human-caused ignition should construction of transmission lines, renewable energy projects, or other developments occur. Permitted activities, such as construction of utility ROWs, involve vegetation removal. This alters the condition of native vegetation communities and individual native plant species and can encourage the spread of invasive plant species, thereby altering potential fire behavior and fire effects. Whether these situations increase wildfire occurrence and extent depends on the degree of vegetation change and the resulting plant community.

Surface disturbance caused by development would generally contribute to the modification of the composition and structure of vegetation communities in the vicinity of developed areas. This may increase the probability of wildfire starts. ROW exclusion areas would prohibit all development of ROWs in areas where they are designated. This would limit the potential alteration of vegetation cover or composition to an uncharacteristic vegetation type and subsequent shift in fire regime condition class (FRCC.).

However, constructing roads and removing invasive plants associated with developments may facilitate wildfire response and help limit the size or extent of wildfires. These activities would create fuel breaks and staging areas for wildfire management. In ROW avoidance areas, the BLM would consider on a case-by-case basis whether a ROW should be allowed.

Overall, the development of energy and minerals resources can increase the probability of wildfires by introducing new ignition sources (Shlisky et al. 2007). Associated facilities, infrastructure, and transmission lines (wildland urban interface) can increase fire and fuels program costs while decreasing wildfire suppression options. Energy development also poses hazards to firefighters from various toxic substances, overhead power lines and the need to protect facilities and evacuate industry personnel. The more acres open to mineral exploration, development, and mining, the greater the probability of human-ignited fire when mineral-related activities occur. Limitations on mineral development may have an indirect effect of decreasing human-caused wildfires. However, as stated previously, constructing roads and removing invasive plants associated with energy and minerals developments may facilitate wildfire response and help limit the size or extent of wildfires. These activities would also create fuel breaks and staging areas for wildfire management.

The development of federal minerals underlying nonfederal surface ownership may impact wildfire management on BLM-administered lands. This would be the case particularly when ownership is in a patchwork pattern because wildfires ignited on nonfederal lands may quickly spread onto and impact BLM-administered lands.

Range grazing management can impact the ability to manage wildfire as a natural process through changes in fine fuels availability, such as grasses. Removing grazing will increase fine fuel loading and does not significantly affect the spread

of invasive plant species. However, removing grazing could also allow for fine fuels such as grasses to build up that could otherwise be consumed by livestock. This could increase the size, extent, or frequency of wildfires (Davies et al. 2010). The influence on fire spread, severity, and intensity would depend on such factors as weather, fuel characteristics, and landscape features. Some evidence suggests that the role of grazing on reducing fire behavior may be limited under extreme burning conditions, such as low fuel moisture and relative humidity, high temperature, and high wind speeds (Strand and Launchbaugh 2013).

Grazing may reduce resistance to invasion from cheatgrass (Reisner et al. 2013). Nevertheless, cessation of overgrazing could relieve these impacts and allow for the recovery of native understory perennials and an increase in sagebrush and herbaceous vegetation cover if invasive plants are not already dominant and sagebrush cover is not excessively high (Strand and Launchbaugh 2013). Recent research indicates that the increase in fine fuel loading, particularly the buildup of litter in bunchgrass crowns, from the removal of grazing can increase bunchgrass mortality in a fire, facilitating the spread of invasive plants. However, livestock grazing also removes herbaceous vegetation that provides side cover for GRSN nests and both insects and forbs needed for brood-rearing. Increasing utilization reduces fine fuel loading but increases the risk that too much side-cover will be removed, reducing GRSN nesting habitat suitability and chick survival. Utilization at too high a level also increases bunchgrass mortality in interspaces and facilitates the spread of invasive plants. Thus, there is a utilization level that reduces the risk of invasive plant spread by promoting healthy bunchgrass plants that can survive a fire and preserves needed side cover for successful GRSN nesting.

Big sagebrush ecosystems of the intermountain west evolved with fewer herbivores than after Euro-American contact, which introduced domestic livestock grazing (Mack & Thompson 1982). These communities are susceptible to invasions by annual grasses even in the absence of fire, and annual grasses can, under some circumstances, dominate the herbaceous understory community (Miller et al. 2011). Once annual grasses sufficiently dominate the understory it creates a continuous, highly flammable fuel that significantly increases the probability of wildfire (Pyke 2011). Once a wildfire occurs, subsequent dominance by invasive annual grasses can increase the frequency of fires. This change in fire regime can transform native shrub-steppe communities into annual grasslands (Miller et al. 2011).

Vegetation and invasive plant treatments that decrease standing vegetation (fuel loading) or alter fuel continuity decrease the intensity or spread rate of wildfires, allowing them to be more easily controlled. For example, reducing the incursion of invasive annual grasses, which increase fuel continuity, would lower the risk of fast-moving wildfire (USGS 2006). Used appropriately, prescribed fire can help control certain invasive plants, either directly or as a preparation for

another type of treatment. However, the presence of invasive plants and the potential of invasives to spread after a prescribed fire would need to be monitored on a site-specific basis. Conversely, management actions that retain or restore a shrub-steppe community and increased sagebrush cover both increase the fuel loading and decrease fuel continuity, thereby increasing potential wildfire intensity but decreasing the potential for large wildfires under all but extreme burning conditions.

Special designations such as ACECs and the management of sensitive resources may restrict fuel treatments on a site-specific basis, depending on the purpose of the individual ACEC. For example, in areas where preservation of particular species or habitats is emphasized, management options and fuel treatments may be limited.

Implementing management for the following resources would have negligible or no additional impact on wildland fire management for all alternatives; therefore, they are not discussed in detail:

- Wild horses and burro
- Special designations
- Special status plants
- Recreation

4.7.3 Impacts Common to All Alternatives

Impacts from Mineral Split-Estate Management

Impacts on wildland fire management from mineral split-estate management are the same as those described for leasable minerals. No additional impacts from mineral split-estate management are expected.

4.7.4 Alternative A

Impacts from Special Status Species—GRSG Management

There would be no additional impacts on wildland fire management resulting from GRSG management under Alternative A. Various BLM directives, such as instruction memoranda, and other policies, such as the National Cohesive Wildland Fire Management Strategy, provide for consideration of GRSG habitat in fuels management and wildfire responses.

Impacts from Vegetation Management

Under Alternative A, the BLM would continue to incorporate vegetation objectives in management actions, which would improve the condition and increase the extent of native vegetation in areas where they are applied. Encouraging the growth of native vegetation under this alternative could

contribute to healthy plant communities and an associated lower risk of high-severity wildfire. Vegetation could also be managed to alter fuel loads.

Impacts from Wildland Fire Management

Under Alternative A, projects and wildfire responses would be designed to prevent the further loss of sagebrush to the extent practicable, potentially retaining native vegetation and reducing wildfire potential. This could reduce the size, extent, and occurrence of wildfires. In addition, prescribed burning may be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, or increasing sagebrush structural diversity. As a result, alteration of vegetation cover or composition is likely to contribute to a shift in FRCC towards condition class I. Further, fuel treatment regimens and design would limit the expansion of invasive annual grasses and reduce the potential for wildfires.

Impacts from Livestock Grazing and Range Management

Livestock grazing would continue to occur under Alternative A and 9,982,126 million acres would be available to grazing in PHMA and GHMA on BLM-administered lands. Allowing grazing throughout most of the planning area may decrease wildfire extent and severity due to the reduction in fine fuel buildup in bunchgrasses caused by livestock grazing. Rangelands would continue to be managed to conform to the BLM's Standards for Rangeland Health, so vegetation communities would continue to be maintained and improved to some extent across the planning area. Land treatments for livestock forage could alter fuels and potential fire behavior as described under *Nature and Type of Impacts*.

Impacts from Travel Management

Impacts from OHV use would continue under Alternative A with 2,669,145 acres open to cross-county travel in PPH, 2,940,051 acres in PGH and 1,828,999 acres in PPH and 2,576,796 acres in PGH limited to existing routes. Under Alternative A, most GRSG habitat would be open or limited to existing routes. Impacts described under **Section 4.7.2, *Nature and Type of Effects***, would continue to occur, particularly in areas open to OHV use.

Impacts from Lands and Realty Management

Under Alternative A, lands and realty management would continue, 257,154 acres would be classified as ROW exclusion areas for new ROW development in PPH and 288,195 acres in PGH and the potential for disturbance from development would be limited in ROW avoidance areas (1,336,146 acres in PP and 1,672,025 in PG). The nature and type of impacts on wildland fire management from ROW avoidance and exclusion areas would be the same as those described under **Section 4.7.2**.

Impacts from Leasable Minerals Management

Under Alternative A, over 9 million acres would be open to leasing, while over 3 million acres would be closed. Stipulations may be applied in certain areas to

reduce impacts from mineral leasing or development, but these stipulations would not be consistent across the planning area. Impacts from leasable mineral development on wildland fire management would continue to occur in areas open to leasing and development. As discussed under Section 4.6.2. The chance of human ignitions under this alternative would continue and could indirectly affect fire management through increased wildfire risk. However, based on the most recent approvals, active mineral leasing or development sites are required to have water storage for wildfire response on-site, increasing the probability that any starts arising from leasable mineral activities could be stopped before burning significant acreage. As described in **Section 4.7.2**, minerals developments could act as staging areas and fuel breaks for wildfire management efforts.

Impacts from Locatable Minerals Management

Under Alternative A, over 900,000 acres would be withdrawn or proposed for withdrawal, while 11,600,814 million acres would remain open. Impacts from locatable mineral development on wildfire management from increased human activity and as described under **Section 4.7.2** would continue to occur in areas open to development.

Impacts from Mineral Materials (Salables) Management

More than 3 million acres would be closed to mineral materials development under Alternative A, while approximately 9 million acres would be open. Impacts from mineral materials development on wildfire management, as described under **Section 4.7.2**, would continue to occur in areas open to development.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative A, approximately 3,134,159 acres within the planning area would be closed to nonenergy leasable mineral leasing. Impacts from nonenergy leasable development on wildfire management, as described under **Section 4.7.2**, would continue to occur in areas open to leasing and development, which is most of the planning area.

Impacts from Special Designations Management

Under Alternative A, the BLM would continue to manage 715,049 acres of ACECs. Existing ACECs may protect vegetation through use restrictions, depending on the specific purpose of the individual ACEC. These impacts are analyzed under each existing RMP within the planning area. As a result, there would be no additional effects from ACEC management on wildland fire management under Alternative A.

4.7.5 Alternative B

Impacts from Special Status Species—GRSG Management

PHMA and GHMA would be designated and would encompass over 4.5 million acres and over 5.5 million acres, respectively. The BLM would apply a 3 percent

human-caused disturbance cap to activities in PHMA. Treatments and restoration activities would not be counted as part of the 3 percent cap. The BLM would also implement numerous conservation measures to reduce impacts from human activities in PHMA, which may reduce the likelihood for human-caused wildfires. Limited vegetation removal under this alternative could lead to increased fuel loads and increased extent of wildfires, as described under **Section 4.7.2**. It also could reduce development-related roads and fuel breaks used for wildfire response.

Impacts from Vegetation Management

Under Alternative B, vegetation management would aim to improve GRSG habitat and prioritize restoration to benefit GRSG habitats. The BLM would require the use of native species when seeding and would consider changes in climate when determining species for restoration. Together, these management actions would alter vegetation communities by promoting increases in sagebrush height, herbaceous cover, and vegetation productivity. Treatments designed to reduce encroachment of conifers and reduce the extent or likelihood of invasive plant species would enhance the condition of native vegetation communities. These management actions could decrease fuel continuity with a subsequent decrease in wildfire size or severity, as discussed under **Section 4.7.2**.

Impacts from Wildland Fire Management

Fuel treatments under Alternative B would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, applying seasonal restrictions and protections for winter range, and requiring use of native species when seeding as a component of restoration. Post-fuels treatments and emergency stabilization and rehabilitation (ES&R) would be designed to ensure long-term persistence of seeded areas and native plant restoration areas.

These management actions would help to retain the extent of sagebrush vegetation and prevent degradation or destruction of sagebrush caused by wildfires. Furthermore, emphasizing the use of native seeds and noninvasive plants would reduce the likelihood for invasion of invasive plants in burned or treated areas. The BLM would also prioritize suppression in PHMA, which would help retain the existing conditions and trends of vegetation in these areas. Impacts from fuels treatments, ES&R, and suppression would be similar to those described under **Section 4.7.2**.

Impacts from Livestock Grazing and Range Management

Under Alternative B, the BLM would not change acres available to livestock grazing. Impacts on wildland fire would be similar to Alternative A. However, the BLM would implement a number of management actions in PHMA to incorporate GRSG habitat objectives into livestock grazing management. Such measures would help to maintain or improve the vegetation condition and could reduce the likelihood of invasive plants introduction or spread, thereby reducing wildfire potential.

Impacts from Travel Management

Under Alternative B, only 2,938,846 acres of BLM-administered lands in GRSG habitat would be open to cross-country use, all within GHMA (a 52 percent decrease from Alternative A for GRSG habitat). Related increases would occur in areas limited to existing routes (approximately 8 million acres in GRSG habitat, a 50 percent increase from Alternative A). Additionally, in PHMA, motorized travel would be limited to existing roads, primitive roads, and trails until travel management planning is complete and the need for additional closures is evaluated. Management actions would also aim to reduce new route construction and restore roads, primitive roads, and trails not designated in travel management plans. These actions would reduce the likelihood of human-caused fires, as discussed under **Section 4.7.2**, but would also reduce access for wildfire response.

Impacts from Lands and Realty Management

Managing the majority of GRSG habitat as ROW exclusion (4.8 million acres, four times more than Alternative A) and as ROW avoidance (6.1 million acres, 77 percent more than Alternative A) would reduce the probability of human-caused wildfires arising from ROW development, as described under **Section 4.7.2**. Decreased development due to exclusion areas could also reduce development-related changes in vegetation and invasive plant removal and construction of roads that would provide fuel breaks and access for wildfire response.

Impacts from Leasable Minerals Management

Over 6 million acres would be closed to fluid mineral leasing, with approximately 4 million acres open under Alternative B (the PHMA would be closed to fluid mineral leasing, while the GHMA would be closed or would require stipulations). Development would be more limited than under Alternative A and would result in fewer development-related roads and fuel breaks that could be used for wildfire management. However, there would also be a reduction in human activities and fewer human-caused ignitions. Over the long term, closures and NSO stipulations would protect vegetation from removal and would reduce invasive plant species introduction or spread from leasable mineral activities. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Locatable Minerals Management

Under this alternative, approximately 5 million acres, most of the PHMA and GHMA, would be withdrawn or be proposed for withdrawal from locatable minerals. These actions would reduce the likelihood that vegetation would be removed and that invasive plants could be introduced, resulting in impacts on wildland fire management, as discussed under **Section 4.7.2**. The remaining areas (almost 7 million acres) would remain open to locatable minerals and would allow for human activities that may lead to human-caused fires. When compared with other alternatives, this alternative allows for more development

and thus more locatable minerals-related activities that can result in increased wildfire risk.

Impacts from Mineral Materials (Salables) Management

Approximately 6.5 million acres, all of the PHMA, would be closed to mineral material sales. The BLM would restore salable mineral pits no longer in use, which would protect native vegetation from removal and reduce nonnative invasive plant introduction or spread arising from salable mineral activities. Over 4 million acres would remain open to mineral material sales. This may lead to impacts on wildland fire management, such as reduced access, increased fuel loading, and other impacts, as described under **Section 4.7.2**.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative B, 6.5 million acres would be closed to nonenergy leasable mineral leasing; BMPs would be required on existing leases. Approximately 6 million acres would remain open. The increase in open areas, compared with Alternative A, could increase human-caused wildfires from nonenergy leasable mineral-related activities, as described under **Section 4.7.2**.

Impacts from Special Designations Management

Impacts from ACEC management on native vegetation under Alternative B would be the same as described for Alternative A.

4.7.6 Alternative C

Impacts from Special Status Species—GRSG Management

Impacts from designating PHMA would be similar to those described for Alternative B. The disturbance cap would apply to all occupied habitat. Impacts on wildland fire management would be similar to those for Alternative B as described under **Section 4.7.2**.

Impacts from Vegetation Management

Management under Alternative C would be similar to that described under Alternative A, though with an increased focus on restoration.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative C would be the same as those described for Alternative A.

Impacts from Livestock Grazing and Range Management

Under Alternative C, no PHMA or GHMA areas would be available to livestock grazing. The effects of livestock exclusion would depend on site conditions, including climate, soils, fire history, and disturbance and grazing history (Strand and Launchbaugh 2013). Grazing is associated with indirect impacts on wildland fire management, as described under **Section 4.7.2**. In particular, improper grazing may reduce resistance to invasion from cheat grass and other invasive annual plant species and cessation of overgrazing could allow for the recovery of

native understory perennials and an increase in sagebrush and herbaceous vegetation cover.

However, removing grazing could also allow for grasses and forbs to build up that could otherwise be consumed by livestock. This could increase the size, extent, or frequency of wildland fires. As stated in **Section 4.7.2**, the influence on fire spread, severity, and intensity would depend on such factors as weather, fuel characteristics, and landscape features.

Impacts from Travel Management

As under Alternative B, additional limitations for motorized travel would apply in GRSG habitat, including closure of all cross-county motorized travel in PHMA and GHMA. The areas limited to vehicle use would be more than twice that under Alternative A. Additionally; new road construction would be prohibited. Impacts from travel and transportation management on wildland fire management under Alternative C would be as described under **Section 4.7.2**.

Impacts from Lands and Realty Management

Under Alternative C, managing all occupied habitats and ACECs as ROW exclusion (10,682,124 acres, more than 12 times more than Alternative A) would reduce the amount of human activity and risk from human-ignited fires but would also limit potential fire breaks and staging areas for fire management.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative C would be similar to those described for Alternative B; however, an increase in the acres closed to fluid mineral leasing (10,615, 593 acres) would reduce the amount of human activity and risk from human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Locatable Minerals Management

Under Alternative C, over 8.8 million acres would be recommended for withdrawal (363 times more acres compared with Alternative A). This would reduce the amount of human activity and risk from human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, over three times more acres would be closed to mineral materials disposal compared with Alternative A. This would reduce the amount of human activity and risk from human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative C, over three times more acres would be closed to nonenergy leasable mineral exploration and development compared with Alternative A. This would reduce the amount of human activity and risk from

human-ignited fires but would also limit the number of water sources and staging areas for fire management.

Impacts from Special Designations Management

Under Alternative C, the BLM would designate all PHMA as new ACECs covering 4.5 million acres. Over 5 million acres, or more than 6 times the area under Alternative A, would be designated as ACECs. New ACEC management plans would be prepared to determine the necessary management in these areas. Impacts from management of ACECs on wildland fire management are as described under **Section 4.7.2**.

4.7.7 Alternative D

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on wildland fire management under Alternative D would be the same as those described for Alternative B.

Impacts from Vegetation Management

Management under Alternative D would be similar to that described for Alternative B; however, the BLM would conduct sagebrush treatments over 2.5 times more acres and would increase juniper treatments by 40 percent. In addition, the BLM would identify strategic areas to prioritize restoration projects. It would use the most current science when implementing restoration projects. In addition, Alternative D provides guidance and priorities for sagebrush, juniper, and invasive plant treatments. Invasive plant prevention measures would be incorporated during wildfire response and other agency activities. Together, these management actions would improve the likelihood for successful sagebrush restoration and vegetation and invasive plant treatments in GRSG habitat over the long term and thus reduce impacts on wildland fire management.

Impacts from Wildland Fire Management

Wildland fire management under Alternative D would be similar to that described for Alternative B, with additional management flexibility and guidance incorporated to tailor management to specific vegetation communities. The BLM would implement a comprehensive approach with priorities for fuels management, wildfire management, and ES&R within GRSG habitat. This would improve wildland fire management, given the limited resources available, and would target those areas that need most protection. Alternative D also establishes quantifiable objectives that would provide a measurable indication of progress or success. As a result, the likelihood for catastrophic wildfire would be reduced and subsequent impacts from wildland fire, described under **Section 4.7.2**, would also be reduced.

Impacts from Livestock Grazing and Range Management

Under Alternative D, there would be a reduction of 98,446 acres available for authorized grazing (with approximately 9.9 million acres available to grazing,

approximately a 1.0 percent reduction from Alternative A) would occur in GRSG habitat due to the closure of 117, 710 acres of Key RNAs to grazing. In addition, the BLM would prioritize allotments for processing grazing permits and leases and would prioritize land health assessments in GRSG habitat; management would change when the authorized livestock use was the cause for not maintaining or improving GRSG habitat values (43 CFR, Part 4180.2(c) and Standard 5). Alternative D provides more detailed guidance for management during drought conditions. Such measures would potentially improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. Together, these efforts would improve consistency of management across the sub-region and would reduce impacts from grazing on vegetation and the impacts on wildland fire management from grazing, described under **Section 4.7.2**.

Impacts from Travel Management

Impacts on wildland fire management from travel management under Alternative D would be the same as those described for Alternative B.

Impacts from Lands and Realty Management

Impacts on wildland fire management from lands and realty management under Alternative D would be the same as those described for Alternative A. The same acreage would be managed as ROW exclusion areas though nearly 75 percent more acres would be managed as ROW avoidance areas, providing additional protection to sensitive vegetation and decreasing impacts on wildland fire management.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative D would be similar to those described for Alternative A. However, nearly 4 times more acres would be open to leasing subject to NSO stipulations, thereby reducing impacts as described in Section 4.7.2.

Impacts from Locatable Minerals Management

Impacts on wildland fire management from locatable minerals management under Alternative D would be the same as those described for Alternative A.

Impacts from Mineral Materials (Salables) Management

Impacts on wildland fire management from mineral materials management under Alternative D would be the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on wildland fire management from nonenergy leasable minerals management under Alternative D would be the same as those described for Alternative A.

Impacts from Special Designations Management

ACECs managed under Alternative A would continue to be managed under Alternative D. However, under Alternative D, the BLM would change management in some ACECs to reduce or modify vegetation impacts from resource uses and development. As a result, large blocks of vegetation would remain intact and the likelihood of invasive plant invasion and impacts on wildland fire management would be reduced. Additional impacts on wildland fire management associated with such uses and development, as described under **Section 4.7.2**, would also be reduced.

4.7.8 Alternative E***Impacts from Special Status Species—GRSG Management***

Management of Core Area and Low Density habitat under Alternative E would have the same impacts as those described for Alternative B.

Impacts from Vegetation Management

Vegetation management under Alternative E emphasizes invasive plant control, avoiding conversion of sagebrush to increase livestock forage, and using the connectivity model and habitat monitoring techniques in the ODFW plan. Some guidance is also provided for conducting vegetation treatments. The same number of acres would be treated as under Alternative A; however, Alternative E would substantially reduce the introduction and spread of invasive plants, compared with Alternative A.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative E would be similar to those described for Alternative D.

Impacts from Livestock Grazing and Range Management

Impacts on wildland fire management from livestock grazing under Alternative E would be similar to those described for Alternative A; however, fewer acres would be available to grazing (8,296,814). This alternative would also include grazing in GRSG habitat outside of Core and Low Density areas and priority for wildland fire management would be concentrated on fewer acres than under other alternatives.

Impacts from Travel Management

Impacts on wildland fire management from travel management under Alternative E would be the same as those described for Alternative B.

Impacts from Lands and Realty Management

Impacts from lands and realty management under Alternative E would be similar to those described for Alternative B. However, fewer ROW avoidance areas would be managed under Alternative E, thus providing fewer protections to vegetation and wildland fire management.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under Alternative E would be the same as those described for Alternative B.

Impacts from Locatable Minerals Management

Impacts from locatable mineral development under Alternative E would be the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on wildland fire management from mineral materials management under Alternative E would be the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on wildland fire management from nonenergy leasable minerals management under Alternative E would be the same as those described for Alternative B.

Impacts from Special Designations Management

Impacts on wildland fire management from special designations management under Alternative E would be the same as those described for Alternative A.

4.7.9 Alternative F

Impacts from Special Status Species—GRSG Management

Impacts on wildland fire management from GRSG management under Alternative F would be similar to those described for Alternative B. However, Alternative F would provide greater restrictions on allowable uses including a 3 percent disturbance cap that includes fire. This would further reduce the acreage of vegetation that would be removed and could reduce impacts on wildland fire management as a result of disturbance and the introduction of invasive annual plants.

Impacts from Vegetation Management

Impacts on wildland fire management from vegetation management under Alternative F would be the same as those described for Alternative B.

Impacts from Wildland Fire Management

Impacts from wildland fire management under Alternative F would be similar to those described for Alternative B. However, Alternative F would require exclusions of grazing post-fire, which would reduce grazing pressure on and trampling of ES&R seedlings. This would improve the likelihood of native vegetation restoration post-fire.

Impacts from Livestock Grazing and Range Management

Impacts from livestock grazing management under Alternative F would be similar to those described for Alternative B. However, Under Alternative F, 25 percent of areas available to grazing in GRSG habitat would be rested per year

(7,506,632 acres open to grazing), and utilization level would be reduced in order to not exceed 25 percent of current use. This could increase fine fuel loading as discussed in **Section 4.7.2** and under certain conditions make wildland fires more difficult to manage. Impacts on wildland fire management, depending on where livestock management is applied could include the need for additional fire management resources in order to manage an increase in fire workload.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative F would be the same as those described for Alternative B.

Impacts from Lands and Realty Management

Impacts from management of ROW avoidance and exclusion areas would be the same as those described under Alternative C.

Impacts from Leasable Minerals Management

Impacts on wildland fire management from leasable minerals management under Alternative F would be the same as those described for Alternative C.

Impacts from Locatable Minerals Management

Impacts on wildland fire management from locatable minerals management under Alternative F would be the same as those described for Alternative B.

Impacts from Mineral Materials (Salables) Management

Impacts on wildland fire management from salable minerals management under Alternative F would be the same as those described for Alternative B.

Impacts from Nonenergy Leasable Minerals Management

Impacts on wildland fire management from nonenergy leasable minerals management under Alternative F would be the same as those described for Alternative B.

Impacts from Special Designations Management

Impacts from management of ACECs would be similar to those described under Alternative C. However, 10 percent fewer acres would be managed as ACECs under Alternative F.

4.7.10 Proposed Plan

Impacts from Special Status Species—GRSG Management

Impacts from GRSG management on wildland fire management under the Proposed Plan would be similar to those described for Alternative B. However, the Proposed Plan would include management of SFA in PHMA, which would provide greater restrictions on allowable uses, including fluid mineral and locatable mineral development. RDFs, buffers, and seasonal restrictions would be applied to leks in PHMA and GHMA. A 3 percent disturbance cap would be

applied, and mitigation would be required for human disturbances. These actions would further reduce the acreage of vegetation, which would be disturbed, removed, or fragmented by human disturbances over the long term.

Impacts from Vegetation Management

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over twice the sagebrush and juniper treatments and 14 percent more invasive plant species treatments, compared with Alternative A, and also would treat crested wheatgrass. In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would decrease invasive annual grasses, would reduce conifer encroachment into sagebrush, and would improve wet meadows management. Use of site-specific analyses and tools like the FIAT assessment (**Appendix H**) would help refine the location for specific areas to be treated. Together, these management actions would improve the likelihood for successful sagebrush restoration and vegetation and invasive plant treatments. This would improve vegetation conditions and thus would result in decreased departure from historic reference conditions and improved FRCC.

Impacts from Wildland Fire Management

The Proposed Plan, as in Alternative D, would focus on the cooperative assessment, planning, and implementation of actions to minimize risk of severe wildfire in GRSG habitat. The Proposed Plan would also require a burn plan before prescribed fire in GRSG habitat and would include assessing management needs based on local conditions, as detailed in **Appendix H**.

A comprehensive strategy for wildland fire management would be implemented under the Proposed Plan, including the GRSG Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment. The assessment would identify priority habitat areas and management strategies to reduce the threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would incorporate recent scientific research on resistance and resilience of Great Basin ecosystems as well as interdisciplinary team knowledge. Potential management strategies are proactive measures, such as fuels management, habitat restoration, and recovery, and reactive measures, such as fire operations and post-fire rehabilitation. Together, these actions would improve FFCC, would reduce the size of damaging wildfires, and would target those areas that need most protection. However, these actions would also increase wildland fire management and fuels treatment costs due to the increased emphasis on protection, conservation, and restoration of GRSG habitat.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan all or portions of key RNAs would be unavailable to grazing. In total, a reduction of 22,765 acres in key RNAs available for authorized grazing (9,956,587 acres available for grazing in GRSG habitat, less than .25 percent reduction from Alternative A) would occur. The BLM would

also implement a number of management actions to meet vegetation objectives in SFA and PHMA, including prioritizing the review and processing of grazing permits and leases in SFA, particularly in areas not meeting rangeland health standards that also contain riparian areas, including wet meadows. Additional management would aim to maintain, enhance, or reestablish riparian areas in GRSG habitat. Such measures would potentially improve resistance to invasion and resilience from wildfire through improved ecological condition of rangeland and riparian and wetland areas. The risk of unintentional damage to vegetation and special status plants remains where lands remain available to grazing. Together, these efforts would improve consistency of management across the sub-region and would reduce impacts from grazing on wildland fire management, described under **Section 4.7.2**.

Impacts from Travel Management

Impacts on wildland fire management from travel management under the Proposed Plan would be similar to those described for Alternative C. Under the Proposed Plan, over 11 million acres (over two times more than Alternative A) would be closed or limited to existing roads, primitive roads, and trails. This would reduce the likelihood of impacts caused by roads, as described under **Section 4.7.2**.

Impacts from Lands and Realty Management

Under the Proposed Plan, the BLM would manage a similar number of ROW exclusions for major and minor ROWs as Alternative A. However, 3 million acres would be ROW exclusion for solar and wind ROWs. In addition PHMA and GHMA (9.9 million acres, nearly three times more than Alternative A) would be ROW avoidance for major and minor ROWs. New ROWs would also be collocated with existing disturbance when possible.

The Proposed Plan would include a cap on human disturbance; the 3 percent disturbance cap on discrete human disturbances would be applied in PHMA at both the Oregon PAC (also known as BSU) and project levels. Human disturbances in PHMA and GHMA would also be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as adaptive management and defined monitoring protocols (**Appendices D and G**), RDFs (**Appendix C**), and lek buffers (**Appendix S**). As a result, lands and realty impacts on wildland fire management would be reduced, as compared with Alternative A.

Impacts from Leasable Minerals Management

Impacts from leasable minerals management under the Proposed Plan are similar to those described for Alternative D. In addition, SFA would be managed as NSO without waiver, exception, or modification, thereby providing additional protections in these areas. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Locatable Minerals Management

Under the Proposed Plan, over 1.8 million acres would be recommended for withdrawal (74 times more acres, compared with Alternative A). This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Mineral Materials (Salables) Management

Impacts on wildland fire management from mineral materials management under the Proposed Plan are similar to those described for Alternative B, though with more acres (over 30,000) closed to disposal. Mitigation would be required for all human disturbances. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Nonenergy Leasable Minerals Management

Impacts on wildland fire management from nonenergy leasable minerals management under the Proposed Plan are similar to those described for Alternative B, though with slightly more acres (91) closed to exploration and development. Mitigation would be required for all human disturbances. This would result in impacts on wildland fire management, as described under **Section 4.7.2**.

Impacts from Special Designations Management

Impacts on wildland fire management from the Proposed Plan would be the same as under Alternative D and as described in **Section 4.7.2**.

4.8 LIVESTOCK GRAZING AND RANGE MANAGEMENT**4.8.1 Methods and Assumptions*****Indicators***

Indicators of impacts on livestock grazing and range management are as follows:

- Changes in permitted AUMs in areas open to livestock grazing
- Changes in the type of livestock permitted on allotments
- Prohibitions on or limitations to the construction or maintenance of structural and nonstructural range improvements
- Modifications to or removal of structural range improvements
- Closure of areas to livestock grazing for the life of the plan
- Changes to the timing, duration, or frequency of permitted use, including temporary closures

Assumptions

The analysis includes the following assumptions:

- This analysis uses PPH and PGH categories for Alternative A only to facilitate comparison across the other alternatives. There are currently no BLM-administered lands formally designated as PPH/PHMA or PGH/GHMA within the sub-regional planning area, and Alternative A would neither result in the designation of PPH/PHMA or PGH/GHMA nor assign additional management actions to PPH/PHMA or PGH/GHMA areas.
- All new and renewed leases and permits would be subject to terms and conditions determined by the BLM Authorized Officer to achieve the management and resource condition objectives for BLM-administered lands and to meet the Oregon and Washington Standards for Rangeland Health and Guidelines for Livestock Grazing.
- Range improvements (e.g., fences, pipeline, water wells, troughs, and reservoirs) could create a localized loss of vegetation cover either directly or indirectly throughout the improvements' useful life.
- The construction and maintenance of range improvements would continue in the decision area as needed. New range improvements would be subject to limitations, as defined in the Oregon GRSG RMPA/EIS. Range improvements are generally intended to better livestock and/or wild horse and burro distribution and management.
- In the Oregon GRSG RMPA/EIS, livestock grazing is not considered a surface-disturbing activity subject to the 3 percent cap.
- Livestock grazing will continue to be an important component of the local economy
- There are currently 169,902 acres unavailable to livestock grazing in PPH and PGH.

4.8.2 Nature and Type of Effects

Impacts on livestock grazing are generally the result of the following:

- Activities that affect forage production
- Areas open to livestock grazing
 - The kind of livestock (e.g., cattle, sheep, or goat)
- The season of use and timing
- The ability to construct and maintain range improvements
- Impacts from human disturbance, including disruption of livestock movement or unwanted dispersal.

Key types of impacts are detailed below.

Protecting GRSG habitat would directly affect livestock grazing under the following circumstances:

- If management were to limit areas open to livestock grazing or available AUMs
- If livestock grazing strategies (e.g., season of use and rotation) were modified, which could increase time and cost to permittees and lessees

For example, management actions to enhance habitat for GRSG could affect livestock grazing management options in the short and long term by restricting grazing intensity or season of use, closing some areas to grazing, or changing livestock rotation patterns, in order to maintain residual herbaceous cover in sagebrush habitat (NTT 2011).

However, managing vegetation resources to benefit GRSG may indirectly benefit livestock grazing by increasing vegetation productivity and improving forage quality in the long term. This would be especially true in cases where current conditions are not meeting BLM Standards for Rangeland Health. For example, in allotments with a history of intensive grazing, transitions in the composition of sagebrush communities may have occurred that have reduced cover or forage for GRSG (Cagney et al. 2010) and forage for livestock. However, when livestock grazing management is put into place to promote health and vigor of the herbaceous community, this may also result in sufficient herbaceous cover to meet habitat requirements for breeding GRSG, such as those specified by Connelly et al. (2000b). However, some areas would require additional active restoration, such as reseeding native grasses and forbs or desirable nonnative species and/or controlling invasive plants.

Under 43 CFR, Part 4180, Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration livestock grazing must not impair watershed function, riparian habitat, water quality, or wildlife habitat. The grazing regulations require that the BLM must take appropriate action “as soon as practicable, but not later than the next grazing season,” upon making determinations that the BLM’s Standards for Rangeland Health are not being met on an allotment and existing livestock grazing is a significant factor (43 CFR, Parts 4180.1 and 4180.2[c]) for failure to achieve standards. Therefore, changes may be required to livestock grazing management in order to meet these standards. Some examples of the nature and type of impacts from management for vegetation, riparian habitat, and water quality are described below.

Vegetation management designed to curb incursion of invasive plant species or encroachment of shrubs could reduce forage availability in the short term.

However, these treatments generally enhance rangeland conditions in the long term (NTT 2011).

Managing riparian habitat can directly impact livestock grazing through excluding livestock at specific sites, increasing herding, adding range improvements (such as cross fences and water gaps), and adjusting season of use and livestock numbers. Managing riparian habitat to maintain proper functioning condition is a goal for BLM-administered lands. This also benefits grazing livestock by indirectly providing cleaner and more reliable water sources and more dependable forage availability.

Protecting water quality and watershed health is one component of BLM's Standards for Rangeland Health. State water and federal quality standards also apply. If it is found that livestock is a significant factor in not meeting water quality standards, additional management needs would be identified and changes could be required in livestock management. Changes include deferring or shortening livestock grazing periods, adding range improvements, excluding livestock grazing from riparian areas, establishing riparian pastures, and increasing livestock herding. In areas requiring exclusion of livestock or other restrictions on livestock management, these limitations could increase costs to permittees and lessees if changes were to reduce AUMs or increase livestock management costs.

Recreation can affect livestock grazing directly through human disturbance and indirectly through rangeland degradation. Direct disturbance can include undesired animal dispersal, which may result in unauthorized use. This would be the result of gates left open and fences cut by recreational users, animal displacement, harassment or injury from collisions or shooting, or from damage to range improvements, particularly from the use of recreational vehicles or from recreational shooting. Disturbance is most likely to occur during the hunting season due to increased presence of people, vehicles, noise and accidental livestock shooting. In addition, OHV use results in indirect impacts, such as increased dust on forage in high use areas, leading to lower forage palatability. Limitations on recreational use in GRSG habitat could indirectly benefit livestock by reducing direct disturbances.

Other direct long-term recreation impacts are disturbance caused by increased levels of human activities. The degree of impacts would vary depending on the following:

- The intensity of recreation; for example, large numbers of people for special recreation permit (SRP) use would likely have a higher level of disturbance, compared with frequent use by a small number of visitors
- The timing of recreation (livestock could be more susceptible to disturbance during the spring when young are present)

- The location of recreation in the allotment (a higher level of disturbance could occur near areas frequented by livestock, such as water sources or salt licks)

As stated above, limitations on recreational use in GRSG habitat could indirectly benefit livestock by reducing direct disturbances.

Limits on construction or use of transportation routes may affect livestock grazing. Road construction may cause loss of forage, harassment, and displacement; thus, reducing these activities may benefit livestock by reducing disturbances. Closing roads or trails not leading to range improvements would also increase forage availability when natural rehabilitation occurs. Limitations on cross-country travel may impact permittees' and lessees' ability to effectively manage livestock if exemptions are not granted for access to allotments. Travel management actions for GRSG protection generally involve increased limitations or restrictions on travel management.

Wildland fire alters sagebrush habitat due to the long time required for sagebrush to regenerate, which may allow for invasion of invasive plants (NTT 2011). Wildland or prescribed fire would remove vegetation and forage over the short term; however, it can increase forage a few years post-fire as herbaceous vegetation increases and woody vegetation is removed or reduced. Impacts on livestock operations could also occur when agency policies or determinations require a rest period following rehabilitation and before livestock grazing is reestablished. These required rest periods may impact the ability of livestock operators to fully use permitted AUMs for a determined period of time. The specific impacts on livestock operators would be short term increased costs to provide alternative forage resources to livestock. The amount of impact on livestock permittees and lessees would depend on the location and intensity of the fire in relation to grazing allotments. Changes in wildland fire suppression and fuels management to protect GRSG habitat would have varying effects on livestock grazing. Measures to protect sagebrush habitat might reduce the spread of wildland fire and the associated disruption to livestock management. Use of livestock to aid in managing fuel loads may provide some increased opportunities for livestock grazing at a site-specific scale. The management of habitat for GRSG using natural disturbance regimes, such as fire, and using vegetation treatments to accomplish biodiversity objectives to improve plant community resilience could also benefit livestock grazing in the long term. This would come about by maintaining a balance of seral stages. In general, removing encroaching junipers may benefit livestock grazing by increasing productivity of forage species and forage quality (Vaitkus and Eddleman 1987; Bates et al. 2000).

Restrictions on ROWs or land transfers may indirectly impact livestock grazing by reducing construction impacts from development of these ROWs (such as dust, displacement, and introduction of invasive plants) in the long term. Lands

and realty actions taken to protect GRSG habitat would involve avoiding or excluding ROWs (e.g., for power lines, pipelines, and other structures) or land transfers in GRSG habitat. They may also slightly decrease disturbance in these areas. However, should development be relocated to areas outside of GRSG habitat these areas may see an increase in construction-related and associated disturbance or displacement of livestock.

Energy and mineral development could impact livestock grazing. During the exploration and testing phase of mineral development, the footprint of disturbance is usually small and localized; therefore, minimal acres available for livestock grazing would be directly impacted. However, during the exploration phase, impacts on livestock dispersal and trespass could occur, increasing time and cost to permittees and lessees. Outside of the exploration and testing phase, surface-disturbing mineral development directly affects areas of grazing in the short term during construction of well pads, roads, pipelines, and other facilities. Potential impacts include an increased potential for the introduction and proliferation of invasive plants that are often unpalatable. Other potential impacts are changes in available forage, reduced forage palatability because of dust on vegetation, limits on livestock movement, harassment, and temporary displacement of livestock. In the long term, a smaller amount of grazing acreage is permanently lost from mining operations following rehabilitation. Improving roads for mineral development could facilitate livestock management by maintaining or improving access to remote locations within allotments. In addition, development may also provide other indirect benefits including but not limited to lower travel costs for livestock transportation and access to nutrient supplements for livestock use. Properly implemented BMPs and reclamation mitigation measures would likely maintain rangeland health and forage levels for livestock. Reducing mineral development in GRSG habitat could reduce potential impacts on grazing, as described above.

Changes in livestock grazing management could impact grazing opportunities in a variety of ways. For example, implementing particular livestock grazing management requirements to benefit GRSG could affect livestock grazing by changing required management actions. Management requirements would increase short-term and long-term costs to permittees and lessees and decrease AUMs, particularly when they require one or more of the following:

- Modification of a grazing strategy
- Change in season-of-use or kind of livestock
- Removal or modification of range improvements, when ability to disperse livestock is impacted

These management requirements could result in direct and indirect economic impacts on individuals, companies, and the local community. For example, if a ranch is dependent seasonally on forage on public lands, reducing or eliminating

AUMs on public lands would affect the entire ranching operation by reducing the total amount of available forage (Torell et al. 2002).

Some management changes may require a short-term output of cost for permittees and lessees but will result in long-term benefits. For example, construction of range improvements to improve livestock distribution and allow use of a larger portion of the rangeland would generally enhance rangeland health in the long term; however, it would have short-term costs which may be borne by the BLM, permittees or lessees, or both. Constructing off-site water sources and fencing riparian and spring sources could keep livestock away from sensitive riparian areas and provide a cleaner more reliable source of water for livestock. However, it would increase costs for permittees and lessees should they be fully or partially responsible for the cost of construction. Other requirements could increase annual operating costs. Examples of this are increased time feeding animals on private land, more complex pasture rotations or herding, requiring increased labor and fuels costs for moving animals.

Where areas are made unavailable for grazing due to a permit or lease is being relinquished, the agency may have to compensate the permittee or lessee for the range improvement projects constructed under a range improvement permit or cooperative agreement, in accordance with 43 CFR, Part 4120.3-6(c).

Implementing GRSG management decisions for special designations, air quality, and special status plants would have negligible or no impact on livestock grazing and range management for all alternatives; therefore, they are not discussed in detail.

4.8.3 Impacts Common to All Alternatives

Impacts from Livestock Grazing and Range Management

Routine maintenance is conducted on livestock grazing infrastructure, such as fences. This would continue under the alternatives that allow livestock grazing to occur. There would be no impacts on livestock grazing from routine maintenance.

Impacts from Travel Management

Access to allotments for authorized use for the BLM and permittees and lessees would be permitted under all alternatives; therefore, travel management restrictions would have limited impacts on ability to manage livestock grazing.

Impacts from Energy and Minerals Management

As described below, for many energy and mineral resources (leasable minerals and nonenergy leasable), there is minimal current development and future development levels are predicted to remain low in the planning area. As a result, impacts on livestock grazing management would be negligible across all Alternatives. In addition, for locatable minerals, potential is unknown, although

some level of development may occur in the future impacts on livestock grazing is likely to be minimal.

Impacts from Locatable Minerals Management

All locatable minerals have the potential to exist within the planning area, but exploration has been minimal and potential is unknown across all alternatives.

Impacts from Leasable Minerals Management

While there is potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; thus, impacts on livestock grazing from development would likely be limited and occur independent of areas available for leasing or stipulations applied.

Impacts from Nonenergy Leasable Minerals Management

There is currently no commercial interest in solid leasables, and potential is unknown. Impacts on livestock grazing are likely to be minimal across all alternatives.

Impacts from Mineral Material Development

While areas open to mineral material extraction vary by alternative, the majority of mineral material extraction sites in the planning area are small in size and result in minimal impacts on livestock grazing.

Impacts from Mineral Split-Estate Management

For the purposes of impacts on livestock, split-estate minerals would be similar to that described above by category of minerals.

4.8.4 Alternative A

Impacts from Vegetation Management

Under Alternative A, management actions for GRSG would be applied in specific RMPs, but actions would not be consistent. BLM's Standards for Rangeland Health would apply across all plans, and livestock grazing practices would be modified should the BLM's Standards for Rangeland Health not be met as a result of livestock grazing.

Under Alternative A, no new priorities are established; existing prioritization is given to projects that benefit multiple resources. Vegetation restoration would directly affect livestock grazing if treatments were to include restrictions on available grazing acreage or changes to permitted AUMs, grazing strategies, or season of use. These could increase costs to permittees. Required rest periods following treatments would impact the ability of livestock operators to fully use permitted AUMs. Management actions for invasive plants would continue under the direction of current RMPs, with the focus on identified infestations using early detection rapid response (EDRR). Impacts of grazing management from

vegetation treatment, as discussed under *Nature and Type of Effects*, would therefore be most likely to occur in these areas.

Impacts from Wild Horse and Burro Management

Overall management direction under Alternative A is to manage for healthy populations of wild horses and burros, while maintaining a healthy ecological balance with other land uses. Horses would continue to be managed within established HMAs and under established AMLs. In the event that periodic removals do not occur, horse populations may be impacted by limitation on gathers; the time between gathers is influenced by limitations in short- and long-term holding facilities, adoptions, and other HMAs outside of Oregon, where emergency situations may mandate adjustments in gather schedules. There would be an increase in competition for available forage by horses as numbers increase above AML.

Impacts from Wildland Fire Management

Under Alternative A, wildfire suppression is not specifically prioritized in PHMA. After firefighter safety, prioritization of suppression would be implemented for multiple resources protection. Mechanical treatments, prescribed fires, and other treatments would be used to treat conifer encroachment and to remove invasive plants. These actions could improve forage in the long term. This would be due to increased herbaceous understory, in turn due to a decline in the cover of shrubs and trees. This would depend on the amount of tree cover removed from the plant community.

On sites where additional sunlight would reach the herbaceous understory, there would also be an increase in forage quality and nutritional content. A minimum rest period from livestock grazing of two growing seasons is generally required on BLM-administered lands after any major vegetation disturbance, including wildfire. Specific timing and the type of rest, as well as any modification to livestock grazing use, would be determined at the site-specific environmental assessment phase. As a result, impacts on costs and time for permittees and lessees would depend on the fire location, relative to grazing allotments.

Impacts from Livestock Grazing and Range Management

Under Alternative A, range management would be based on individual RMPs in the planning area. Approximately 771,773 AUMs would be permitted and 12,317,554 acres would be available to grazing on BLM-administered lands, including 9,982,126 acres in PPH and PGH.

All permits and leases under Alternative A would continue to be required to meet or make progress toward meeting standards defined in the BLM's Standards for Rangeland Health. Evaluations of achievement or significant progress toward achievement would continue to occur. Grazing permits and leases would be renewed approximately every 10 years based on the district specific renewal schedules. Grazing permits, including grazing systems, permitted AUMs, and allotment boundaries, would be modified as necessary to conform to

Standards and Guidelines for Livestock Grazing Management when grazing were determined to be the cause of a standard not being achieved, as required by regulation on BLM-administered lands. In this case, changes to management would be implemented prior to the start of the next grazing season per BLM regulation. As a result, any changes to grazing management would occur on a case-by-case basis at the time of the determination and would most likely change in those allotments found to be not meeting BLM's Rangeland Health Standards.

Management changes designed to address nonattainment of the wildlife habitat standard could reduce permitted AUMs and change current timing, duration, or frequency of permitted use, including temporary closures. Drought management actions would be directed to allotments with resource concerns. This alternative would not direct the BLM to manage certain areas more intensively for GRSG habitat objectives; therefore, impacts on grazing in GRSG habitat would be similar to those throughout the planning area.

Voluntary relinquishment of grazing privileges would remain an option. However, based on past rate of voluntary relinquishment in the planning area, few permittees are likely to use this option (BLM 2013a).

Lands would be maintained and restored to maintain healthy native plant and animal species. Changes to management would be directed first to allotments not meeting BLM's Standards for Rangeland Health where current livestock is a significant factor in non-attainment. Similarly, the focus in riparian areas and wetlands would be to manage, maintain, protect, and restore riparian areas and wetlands toward proper functioning condition.

As described above, managing riparian habitat can directly impact livestock grazing through excluding livestock at specific sites, increasing herding, and adding range improvements, such as cross fences and water gaps. Such changes in grazing management options could increase time or costs for permittees.

In general, structural range improvement construction and modification would be allowed in the decision area when needed to support grazing systems or improve livestock distribution on a case-by-case basis, allowing for options for management for permittees and lessees when needed to alter grazing use to meet Standards for Rangeland Health. Range improvement projects would be designed to maintain or improve GRSG habitats. Consideration of GRSG habitat needs would likely reduce the number of constructed range improvements. In some instances, improvements may be removed to assist in attaining standards.

Examples are fences, water developments, and vegetation treatments. This would allow management options for permittees. Fences would be constructed to as determined necessary for resource and resource use programs under

individual RMPs; however, few specific provisions are included for GRSG, so additional costs could be limited.

Impacts from Recreation Management

Potential for unwanted disbursement and disturbance of livestock from recreation, particularly during the hunting season is possible, as described in **Section 4.8.2, Nature and Type of Effects**. Some limited potential for disturbance from large recreation groups could occur due to lack of new restrictions on SRPs in the decision area.

Impacts from Travel Management

Under Alternative A, conflicts are most likely to occur between livestock grazing and OHV use. This would occur in the 2,669,145 acres open to cross-county travel in PPH and 2,940,051 acres in PGH. Impacts would occur where areas open overlap with areas available to grazing. Impacts could occur to some extent on the 1,828,999 acres in PPH and 2,576,796 acres in PGH and limited to existing routes, with impacts concentrated on areas that are also available to grazing. Access to allotments for permittees and lessees would be maintained.

Impacts from Lands and Realty Management

Under Alternative A, approximately 257,154 acres would be classified as ROW exclusion areas for new ROW development in PPH and 288,195 acres in PGH. Disturbance of forage from development activities would be reduced where areas available for livestock grazing overlap these ROW exclusion areas. Similarly, the potential for disturbance from development would be limited in ROW avoidance areas (1,336,146 acres in PPH and 1,672,025 in PGH).

4.8.5 Alternative B

Impacts from Vegetation Management

Under Alternative B, restoration projects in priority habitat would be designed to benefit GRSG and, based on the likelihood of success, with reestablishment of sagebrush cover as the highest priority. Projects to remove nonnative species and improve habitat are often be in line with current grazing management practices and could improve livestock forage in the long term.

Vegetation restoration would directly affect livestock grazing if treatments were to include restrictions on available grazing acreage or changes to permitted AUMs, grazing strategies, or season of use. Any of these could result in increased costs to permittees and lessees. Impacts could occur on range management when objectives for range management do not match with those for GRSG habitat. Post restoration management requirements could also change grazing systems or other range management components, with a potential for increased costs and time for permittees and lessees. As a result, livestock grazing management from vegetation management could be limited in PHMA, particularly in important seasonal habitats and in areas post-restoration.

Actions for invasive plant management would be similar to that described under Alternative A. There would be a greater focus on restoration and potential for impacts on grazing management in priority habitat.

Impacts on livestock management from vegetation treatment would be most likely when timing or specific location of treatment occurs in times of year or allotments where other options for livestock are limited.

Impacts from Wild Horse and Burro Management

Under Alternative B, HMAs in PHMA would be a higher priority for gathers. For the livestock grazing allotments that overlap HMAs in PHMA, wild horse and burro numbers would stay within appropriate management levels, resulting in maintenance of the level of forage permitted for livestock use. HMAs that do not contain PHMA would be categorized as a low priority for future gathers. As a result, forage availability would potentially decrease in the long term due to increased competition with growing populations of wild horses that have not been gathered in those areas.

Impacts from Wildland Fire Management

Under Alternative B, suppression of fire would be prioritized when PHMA was threatened. As a result, disturbance on livestock grazing could be reduced in the long term due to fewer large wildland fires in this area. Fires burning outside of PHMA or GHMA may increase in size when they are prioritized for suppression after fires burning in GRSG habitat. This could slightly increase the disturbance to grazing outside of GRSG habitat.

Management actions to restore post-fire habitat could impact range management. Under Alternative B, management would be adjusted to support successful restoration post rehabilitation as needed, which could temporarily or permanently reduce grazing in areas reseeded post fire. The level of impacts would depend on size, location, and intensity of the fire and the related level of restoration needed.

Fuels management projects to reduce fine fuels could include the use of targeted livestock grazing. This would likely involve high-intensity, short-duration grazing in the fall through spring to target cheatgrass or medusahead. It would involve intensive management, such as increased herding and temporary fencing, in order to concentrate livestock in the desired area. As a result, management costs and time would be high for this use, therefore use in the planning area may be limited.

Impacts from Livestock Grazing and Range Management

Under Alternative B, no management actions would result in direct changes to acres available to grazing and permitted AUMs. The number of AUMs would be the same as Alternative A (771,773 AUMs).

All GRSG habitat objectives and management would be incorporated into permit and lease renewals; therefore, impacts would occur at a site-specific level during the renewal process. Land health assessments would include indicators specific to achieving GRSG habitat objectives for rangeland health standard 5 , including local and state seasonal habitat objectives where available or general recommendations from Connelly et al. (2000b) and Hagen et al. (2007) if not available. As described under **Section 4.8.2**, this could require changes to management of a given allotment. Examples of this are changes in the kind of livestock permitted, changes to livestock rotation, or changed season of grazing permitted in order to meet these standards. Such changes could decrease management options and, therefore, increase the time and costs for permittees and lessees.

However, many of the habitat objectives for GRSG, such as defined in Connelly et al. (2000a) and Hagen et al. (2007) are in line with those currently used to assess land health, as they focus on maintaining or improving land health and grassland vegetation. When fine-scale and site-scale GRSG habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), the GRSG habitat suitability indicators for seasonal habitats identified in the HAF would be measured. Completion of land health assessments and permits and leases would be prioritized in PHMA. The focus would be on allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG. As a result, impacts on range management would be most likely to occur in these areas.

Over all, effects would be similar to Alternative A but focus on PHMA due to the emphasis of management actions in this habitat. In the long term, livestock grazing in priority habitat would be reduced under compared with Alternative A should current grazing practices in in a given allotment be found to be contributing to a failure to meet GRSG habitat objectives; however, impacts would be site specific and likely would occur gradually.

The BLM would work with ranchers so that operations within GRSG habitat could be planned as single units. In this way, the time and costs required to implement these changes could be reduced, although they would still be higher than under current conditions, where no change would be required. Voluntary relinquishment of grazing privileges would remain an option in PHMA as discussed under Alternative A.

Vegetation treatments that benefit livestock forage could be completed only if these treatments would also conserve, enhance, or improve GRSG habitat; therefore, the management options in PHMA could be reduced and AUMs may be adjusted in the long term.

Under drought conditions, as under Alternative A, grazing management changes would be implemented as needed, in accordance with WO IM 2013-094 or subsequent direction. However, under this alternative the focus would be on

adjusting management in PHMA, so impacts would be more likely to occur in this area.

Under Alternative B, riparian areas would be managed with a goal of proper functioning condition within priority habitat, as discussed in Alternative A. Measures to enhance wet meadows and to reduce hot season grazing on riparian and meadow complexes could limit management options for livestock in these areas. These measures also could impact the ability to effectively distribute livestock.

Structural range improvements, such as fences and exclosures, in priority habitat under Alternative B would be permitted only when they would also conserve or enhance GRSG habitat. In addition, some fences would require installation of flight diverter to lessen risk for GRSG impacts, so the cost of building or maintaining these structures would increase, compared with Alternative A.

Similarly, new water developments from diverting springs or seeps would be permitted only when GRSG habitat would also benefit. For this reason, the location of these new improvements could be limited, increasing costs for developments and potentially impacting ability to effectively disperse livestock, increasing time and cost for management.

Overall, water improvements and fences are likely to be removed or modified to some extent under Alternative B, thereby increasing management costs and potentially decreasing grazing or shifting grazing use patterns in the long term.

Impacts from Recreation Management

Impacts would be the same as under Alternative A.

Impacts from Travel Management

As described under Alternative A, limiting travel management could decrease disturbances to livestock. Under Alternative B, only 2,938,846 acres of BLM-administered lands in GRSG habitat would be open to cross-country use, all within GHMA (an 52 percent decrease from Alternative A for GRSG habitat). Similarly, areas limited to existing routes would increase compared with Alternative A (7,075,386 total acres in GRSG habitat, a 60 percent increase from Alternative A). Additionally, in PHMA, motorized travel would be limited to existing roads, primitive roads, and trails until travel management planning is complete and the need for additional closures is evaluated. As a result, disturbance of livestock from recreational vehicles is likely to be reduced, particularly in PHMA. Access to allotments for authorized use would be permitted under this and all alternatives.

Impacts from Lands and Realty Management

Under Alternative B, no new ROW authorizations would be permitted in priority habitat unless the development would occur within the existing developed footprint. Under this alternative, 4,547,043 acres of GRSG habitat

would be managed as ROW exclusion areas (approximately 8 times higher than Alternative A); 5,662,632 acres would be managed as ROW avoidance areas in GRSG habitat (88 percent increase over Alternative A). As a result, indirect impacts on livestock grazing from disturbance would be limited in ROW avoidance areas open to livestock grazing and would decrease, compared with Alternative A.

4.8.6 Alternative C

Under Alternative C, no resource decisions would impact grazing because grazing would be eliminated within GRSG habitat.

Impacts from Vegetation Management

Under Alternative C, prioritization of areas for restoration and vegetation management actions would be similar to that discussed under Alternative B. There would be no impacts on livestock grazing, because livestock grazing would be eliminated.

Impacts from Wild Horse and Burro Management

Management actions for wild horses and burros would be as described for Alternative A. There would be no impacts on livestock grazing, because livestock grazing would be eliminated.

Impacts from Wildland Fire Management

Under Alternative C, management priorities and impacts would be similar to those described under Alternative B. There would be no impacts on livestock grazing, because livestock grazing would be eliminated.

Impacts from Livestock Grazing and Range Management

Alternative C would eliminate livestock grazing from all allotments completely or partially within occupied GRSG habitat. Grazing would continue on approximately 787,139 acres outside of GRSG habitat. There would be 0 AUMs in GRSG habitat. Eliminating grazing from all allotments intersecting occupied habitat would result in economic impacts on permittees and lessees. As discussed under **Section 4.8.2**, permittees and lessees would be faced with reducing livestock numbers for their operations or locating replacement forage, potentially at higher costs and with limited availability. Changes to permitted AUM levels could also impact property values of ranches, which act as base properties for authorized permittees and lessees. Closures would also impact permittees' and lessees' current seasonal rotations or other management strategies on federal and private lands. Due to these factors, the elimination of permitted grazing in PHMA could result in permittees and lessees going out of business, with impacts on them and local communities as a whole. Additional details of the economic impacts are discussed in **Section 4.20**, Social and Economic Impacts (Including Environmental Justice).

No specific management actions related to range infrastructure are in place under Alternative C due to the lack of permitted grazing. Proposed restoration

includes removing water developments. In areas unavailable to grazing, any maintenance requirements for remaining infrastructure and associated costs would likely fall to the BLM. Permittees and lessees who have investments on impacted federal lands in occupied habitat would receive appropriate compensation, based on federal regulations in 43 CFR, Part 4120.3-6(c). Fencing on boundaries between public and private lands in occupied habitat may be necessary to prevent livestock from trespassing on public lands where grazing is excluded. Much of this cost would likely fall on the permittees and lessees for private land fenceings to exclude livestock from accessing public lands. However, the BLM may also contribute to the cost of fences if it is beneficial to GRSG. If fences could not be constructed, the cost to the BLM for compliance would increase dramatically.

Lack of ability to use range improvements and water developments on occupied habitat could result in other indirect costs. Permittees and lessees who currently rotate pastures between private and federal lands would need to construct additional water developments or other structural range improvements on private pastures. This would increase time and costs. Removing grazing from occupied habitat could increase conflicts between grazing and other resources and resource uses on lands of other surface ownership. This would be the case should livestock grazing increase on BLM-administered or private lands outside of occupied habitat.

Impacts from Recreation Management

No impacts would occur under Alternative C due to the elimination of grazing from occupied habitat.

Impacts from Travel Management

As under Alternative B, additional limitations for motorized travel would apply in GRSG habitat, including closure of all cross-county motorized travel in PHMA and GHMA. Additionally, new road construction would be prohibited. However, impacts on livestock grazing would not occur due to the elimination of grazing.

Impacts from Lands and Realty Management

Under Alternative C, ROW exclusion areas would be the same as Alternative B for PHMA and increased 18 fold over Alternatives A for GHMA. Avoidance areas would be as described under Alternative B for PHMA and decreased to zero for GHMA. However, due to the elimination of grazing in GRSG habitat, these actions would not impact livestock management.

4.8.7 Alternative D

Impacts from Vegetation Management

Under Alternative D, priority for restoration would be on the focal areas identified as restoration zones, as well as on other habitat important to GRSG. As a result, potential restrictions on grazing management are most likely to

occur in these areas. Impacts would be similar to those described under Alternative B but potentially across a broader area. Restoration is also likely to improve habitat for both livestock and wildlife in the planning area in the long term. Similarly, actions to remove juniper and control the spread of invasive plants may improve habitat conditions for both GRSG and livestock.

Impacts from Wild Horse and Burro Management

Under Alternative D, AMLs may be adjusted in the long term to meet GRSG habitat objectives. Comparable reduction and modification in livestock grazing would occur if livestock are also a significant factor in not meeting GRSG habitat suitability objectives; therefore, changes to wild horse and burro management are not likely to increase livestock forage.

Impacts from Wildland Fire Management

Under Alternative D, management actions would focus on creating fuel breaks and cooperating with other agencies to assess, plan, and implement actions to minimize risk of severe wildfire in GRSG habitat. Treating approximately 3 percent of GRSG habitat per year over the next 10 years could have short-term impacts on grazing should forage become unavailable in treated areas. However, treatments should reduce the intensity and occurrence of wildfire in the long run, although the exact impact is likely to vary by site-specific area. Specific suppression priorities would be applied in PHMA and GHMA, with emphasis on nesting, winter habitat and PHMA. There is therefore potential for reduced risk of fire and associated impacts on grazing in these areas. There also is a potential for increased risk of fire in other parts of the planning area should resources be redirected to GRSG habitat.

Impacts from Livestock Grazing and Range Management

Under Alternative D, there would be slight reduction of 97,725 acres in key RNAs available for authorized grazing (with 12,183,315 acres available to grazing, including 9,923,018 acres in GRSG habitat, an approximately 1 percent reduction from Alternative A). A reduction of 7,948 AUMs in key RNAs (763,825 permitted AUMs, an approximately 1 percent reduction compared with Alternative A) would occur in GRSG habitat due to the closure of 15 key RNAs (two of which are already closed and unavailable to grazing). In the specific areas proposed for closures, permittees and lessees would need to locate alternative forage or reduce AUMs, with economic impacts, as described under Alternative C, albeit at a reduced scale.

Permit renewal and associated land health assessment would be prioritized in occupied habitat for those in category I. As a result, changes to permitted grazing level and grazing systems are more likely to occur in these areas. The goal under Alternative D is to assess all category I, M, and C allotments in GRSG habitat within 10 years and to change permits as needed to make progress toward or achieve all standards. As stated in **Chapter 2**, the emphasis

is on allotments in GRSG habitat, with priority order for land health assessments as follows:

1. Allotments in PHMA that have never been evaluated
2. Allotments in PHMA that have not been reevaluated in 10 or more years
3. Allotments in GHMA that have never been evaluated
4. Allotments containing GHMA that have not been reevaluated in 10 or more years

As a result, changes to grazing management are likely to occur in PHMA first and GHMA second.

In the long term, this action could improve rangeland habitat conditions for livestock as well as wildlife by focusing management on those lands that are in most need of improvement.

When fine-scale and site-scale GRSG habitat assessment and monitoring is needed or required (e.g., as a component of a rangeland health assessment), the GRSG habitat suitability indicators for seasonal habitats identified in the HAF would be measured. This action would result in a more standardized approach to management compared with Alternative A. In addition, this alternative allows for some flexibility in objectives to align with regional habitat conditions, making these objectives more obtainable and reducing potential impacts on grazing management.

Similarly, as described under Alternative B, modifications to grazing systems may be required to meet seasonal habitat requirements. However, under Alternative D, there is increased flexibility in this management approach due to adjustment for regional conditions; therefore, required changes to management and related impacts on permittees and lessees would be reduced.

For allotments not meeting BLM's Standards for Rangeland Health where livestock grazing is determined to be a significant factor, appropriate changes in grazing management will be implemented prior to the start of the next grazing year.

Voluntary relinquishment of grazing privileges would remain an option in PHMA as discussed under Alternative A.

Management for riparian and wetlands areas would be the same as that described under Alternative B.

Under Alternative D, new and existing range improvements would be allowed to enhance their year-round functionality when livestock are absent. Range

improvements would be modified with wildlife escape ramps to prevent danger of GRSG or other wildlife entrapment. In cases where water improvements have population-limiting implications, modifications or removal could occur. New waters, if feasible would be developed, before eliminating existing ones. As a result, some water developments may be modified; however, the ability to distribute livestock should generally be maintained and impacts on permittees and lessees should be limited. Construction of new livestock facilities would be avoided within 1.2 miles of leks.

Forage enhancement treatments would be limited, as described under Alternative B. Structural range improvement could also be limited as under Alternative B, but the emphasis under Alternative D is on improved grazing management relative to GRSG. For this reason, there is a potential for improvement to both livestock and GRSG habitat conditions, especially in the long term.

Alternative D would apply more specific regulations on use of supplements in GRSG habitat on a year round basis as compared with Alternative A. Supplementation of livestock within 1.2 miles of occupied and pending leks would be avoided unless it is part of a plan to improve ecological health or to create mosaics in dense sagebrush stands that are needed for optimum GRSG habitat. Based on the trends the use of supplemental feed is minimal and could reduce or enhance available forage by improvement in vegetation community composition.

Impacts from Recreation Management

Under Alternative D, existing SRPs would be evaluated and would be changed if needed for GRSG protection. Disturbance to livestock from recreation is likely to be reduced in the long term compared with Alternative A, particularly near leks.

Impacts from Travel Management

Under Alternative D, travel management plans would be implemented within 5 years, as described under Alternative B. Area open to cross-county travel would be as described in Alternative B. Monitoring before travel management planning would provide information about ongoing activities that could be utilized to create travel management plans that would reduce the conflict between recreation use and livestock grazing, compared with Alternative A.

Impacts from Lands and Realty Management

Under Alternative D, current ROW exclusion areas in PHMA, as under Alternative A, would be managed as ROW exclusion areas. All other PHMA would be designated as avoidance areas for new ROW authorizations. All new ROWs in GHMA would require the BLM to cooperate with ODFW to determine impacts on occupied, suitable, or potential habitat, and development and associated disturbance to livestock would be avoided in occupied habitat and minimized in suitable or potential habitat compared with Alternative A.

4.8.8 Alternative E

Impacts from Vegetation Management

Under Alternative E, converting sagebrush for livestock grazing is discouraged and additional seasonal vegetation treatment restrictions would be applied. As a result, management options to improve forage for livestock would be restricted. This would result in the potential need to increase management, such as herding, in order to provide sufficient forage for livestock. Actions to remove juniper and to control invasive plants spread may improve habitat conditions for both GRSG and livestock in the long term.

Impacts from Wild Horse and Burro Management

Impacts from wild horse and burro management would be similar to those described under Alternative B.

Impacts from Wildland Fire Management

Under Alternative E, management actions would focus on preventing fire from entering at-risk communities in GRSG habitat, such as cheatgrass in understory and overstory sagebrush, and in reducing the spread of invasive plants. Land within 3 miles of a lek, as well as identified winter range, would be given top priority in fire suppression.

These management actions would likely result in appropriation of funds and suppression efforts in areas most in need of protection for GRSG. In many cases, these actions also would support, maintain, or improve land health conditions. Such treatment as removing juniper would be conducted when necessary but may be limited, compared with Alternative A, especially in lower elevations. As a result some local restrictions may occur on the ability to treat vegetation to improve livestock forage.

Impacts from Livestock Grazing and Range Management

Under Alternative E, AUMs available to grazing would be the same as under Alternative A (771,773 AUMs). Acre available to grazing in GRSG habitat would be reduced compared with Alternative A (8,296,814 acres in GRSG habitat, a 17 percent reduction). The difference in acreage in this alternative is due to the difference an increase in PHMA compared with Low Density habitat (as defined in Alternative E) rather than a change in management direction. No changes to use or management would be required when livestock grazing management would result in a level of forage use consistent with direction and habitat quality meeting BLM's Standards for Rangeland Health. Impacts on livestock grazing, therefore, would be similar to those described under Alternative A for areas meeting standards and objectives and maintaining appropriate levels of use under existing management direction (RMPs).

Structural range improvements would be allowed in order to maintain or enhance habitat quality for GRSG. Springs would be developed to maintain free-flowing nature. If this were to limit livestock use, the ability to distribute

livestock and the costs and time for permittees and lessees would be impacted. Similarly, structural improvements would not be permitted within .6 mile of leks, and distribution would be impacted. Fences would be required to be modified within a mile of leks, with similar increases in time and costs for permittees and lessees.

Supplemental winter feeding policy would be applied with impacts as described under Alternative D.

Impacts from Recreation Management

Under Alternative E, recreation management would be similar to that described under Alternative A, but seasonal restrictions would be imposed to limit disturbance to GRSG. Such restrictions would also reduce disturbance to livestock.

Impacts from Travel Management

Under Alternative E, travel management restrictions on OHV use would be applied to areas within 2 miles of leks. This alternative would impose 2-mile buffers around occupied leks during breeding season. In addition, OHV use should be monitored and information utilized to mitigate potential conflicts with recreation and livestock grazing. As a result, any indirect impacts on livestock from travel near leks would be reduced. Overall, areas open to cross-county travel would be the same as Alternative B for PHMA/Core Area habitat and decreased to 1,610,288 in GHMA/Low Density habitat (45 percent reduction from Alternative A in GHMA). There is a slight increase in the change of disturbance from OHV use in this alternative in Low Density habitat as a result. Permittees and lessees would still be allowed access to allotments for management.

Impacts from Lands and Realty Management

Under Alternative E, all Core Area habitat would be an exclusion area for ROW development, with impacts as described under Alternative B. For Low Density habitat, exclusion areas would be reduced compared with Alternative A (156,523 acres, 45 percent reduction). However, mitigation would be required to avoid, minimize, and apply compensatory mitigation to reduce impacts on GRSG habitat caused by BLM activities. As a result, disturbance from development in Core Area and Low Density habitat would decrease as compared with Alternative A.

4.8.9 Alternative F

Impacts from Vegetation Management

Vegetation management and associated impacts on livestock management would be similar to that described under Alternative B. As under Alternative E, management to avoid sagebrush reduction and treatments to increase livestock or big game forage in occupied habitat may further limit management options for permittees and lessees.

Impacts from Wild Horse and Burro Management

Impacts from wild horse and burro management would be similar to that described under Alternative B. However, under Alternative F, wild horse and burro populations would be reduced 25 percent from current AMLs in GRSG habitat. This would result in reduced competition for forage resources with wild horses and burros.

Impacts from Wildland Fire Management

Under Alternative F, wildland fire management impacts are generally similar to those described under Alternative B. One exception would be measures to protect GRSG habitat post-fire. Livestock grazing would be excluded from burned areas until woody and herbaceous vegetation meet GRSG objectives, which could result in long-term (10 to 50 years or longer) exclusion from burned sites. It would generally take more than a decade to reestablish adequate Wyoming sagebrush cover in low precipitation areas. The level of impacts would depend on locations, size, and intensity of wildfire in GRSG habitat in relation to location and level of authorized grazing. Requirements to include livestock exclosures to monitor fire restoration progress are anticipated to have negligible impacts due to the limited size of exclosures.

Impacts from Livestock Grazing and Range Management

Under Alternative F, 25 percent of areas available to grazing in GRSG habitat would be rested per year (7,506,632 acres available to grazing), and in addition, utilization level would be reduced in order to not exceed 25 percent of current use with permitted AUMs reduced to 289,414 (approximately 62.5 percent reduction as compared with Alternative A). The reduction in authorized grazing in GRSG occupied habitat, while not as complete as under Alternative C, would include 25 percent reduction below permitted use levels. While allotment specific impacts would be determined at implementation, overall, livestock grazing would be reduced in the decision area, potentially requiring permittees to reduce grazing or locate alternative sources of forage, with potential for economic impacts on as discussed in Alternative C.

In areas where grazing would still be permitted, management would be similar to that described in Alternative B, with the addition of other protective measures for GRSG habitat (such as increased restrictions on grazing after fire to facilitate achievement of rehabilitation objectives to benefit GRSG and restriction on all vegetation treatments that benefit livestock grazing). As a result, management options would be limited and time and costs for permittees would be increased compared with Alternative A.

Voluntarily relinquishing grazing privileges would remain an option in PHMA, as discussed under Alternative A.

Alternative F includes increased restriction on the ability to construct new water developments and range improvements. Under Alternative F, all new structural range developments in occupied GRSG habitat would be avoided. The

exception would be if independent peer-reviewed studies show that the range improvement structure benefits GRSG. This would likely lead to the authorization of minimal improvements. Similarly, management actions prohibiting new water development and requiring modification or removal of water developments could limit water sources for livestock. As a result, the ability to distribute livestock effectively would be reduced. Also, a change in grazing systems or permitted use level may be required to maintain GRSG habitat objectives. This could increase time and costs for permittees and lessees.

Impacts from Recreation Management

Impacts under Alternative F would be similar to those described under Alternative B. In addition, seasonal restrictions would be applied to camping and nonmotorized recreation within 4 miles of leks. These restrictions may impose some limitations on permittees' and lessees' ability to access allotments for management.

Impacts from Travel Management

Impacts would be similar to those described under Alternative B. Restrictions on construction of new roads within 4 miles of active leks and to upgrades on existing routes could reduce potential disturbance.

Impacts from Lands and Realty Management

Under Alternative F, GRSG habitat would be an exclusion area for ROW authorizations; PHMA exclusion areas would be as described for Alternative B and GHMA exclusion areas would be the same as described in Alternative C. As a result, impacts on livestock grazing management from development are likely to be reduced across the planning area in the long term compared with Alternative A.

4.8.10 Proposed Plan

Impacts from Vegetation Management

Management under the Proposed Plan would be similar to that described for Alternative D. The BLM would implement over two times more sagebrush and juniper treatments and 14 percent more invasive plant species treatments than Alternative A, as well as crested wheatgrass treatments. In addition, the Proposed Plan includes management and vegetation treatment objectives and prescriptions that would decrease invasive annual grasses, would reduce conifer encroachment into sagebrush, and would improve management of wet meadows. Use of site-specific analysis and tools like the FIAT Assessment (**Appendix H**) would help refine the location for specific areas to be treated. Approximately 1,083,110 acres are targeted for conifer reduction, sagebrush thinning, and invasive plant control in treatment objectives under the Proposed Plan. Impacts, including the need for temporary closures to grazing or modification of grazing systems, could occur should treatments for GRSG not match vegetation objectives for livestock grazing. In most cases, however,

treatments (e.g., conifer removal) would improve forage conditions in the long term.

Impacts from Wild Horse and Burro Management

Impacts from wild horses and burros would be similar to those described under Alternatives B and D. Under the Proposed Plan, prioritizing gathers in HMAs and HAs in priority GRSG habitat to meet established AMLs would reduce any current levels of forage competition between WHBs. It would also reduce livestock on allotments in priority habitat and aid in meeting GRSG habitat objectives.

Impacts from Wildland Fire Management

The Proposed Plan, as in Alternative D, would focus on the cooperative assessment, planning, and implementation of actions to minimize the risk of severe wildfire in GRSG habitat. The Proposed Plan would also require a burn plan before prescribed fire in GRSG habitat and would include an assessment of management needs based on local conditions, as detailed in **Appendix H**. Potential management includes fuels management and habitat restoration and recovery, as well as fire operations and post-fire rehabilitation. These actions may result in temporary, site-specific, limitations on grazing management, including temporary closures to grazing and adjustments to season of use to allow for successful implementation of fuels treatment and post-fire rehabilitation. In the long term, fire management would reduce the likelihood of widespread wildfire in GRSG and subsequent disturbance of livestock and reduction of forage, as compared with Alternative A.

As under Alternative B, fine fuels management projects using livestock grazing could result in site-specific opportunities for short-term increases in grazing in PHMA, requiring intensive management; however, impacts are likely to be minimal overall.

Impacts from Livestock Grazing and Range Management

Under the Proposed Plan all or portions of key RNAs would be unavailable to grazing, which is slightly lower than Alternative D. The Proposed Plan would reduce 22,765 acres in key RNAs available for authorized grazing (12,232,499 acres available to grazing, including 9,956,587 acres in GRSG habitat, less than .5 percent reduction from Alternative A). It also would reduce 2,388 AUMs in key RNAs (769,385 AUMs, less than .5 percent reduction from Alternative A). In the specific areas proposed for closures, permittees and lessees would need to locate alternative forage or reduce AUMs, with the potential for economic impacts as described under Alternative C and D, but at a much reduced scale.

Permit renewal and associated land health assessment would be prioritized in GRSG habitat, with a focus on areas not currently meeting standards for rangeland health. As stated in **Chapter 2**, the emphasis is on allotments in GRSG habitat. There would be priorities for review for land health assessments as allotments in SFA, followed by allotments in PHMA outside of SFA.

Precedence would be given to existing permits and leases in these areas not meeting rangeland health standards, focusing on those containing riparian areas, including wet meadows. Impacts are likely to follow this order. In the long term, this action could improve rangeland habitat conditions for livestock and wildlife by focusing management on those lands that are in most need of improvement.

As under Alternatives B, D, and E, rangeland health assessment would measure the GRSG habitat suitability indicators for seasonal habitats. Under the Proposed Plan, specific indicators for habitat are identified in **Table 2-4**. Site-specific review of seasonal habitat type would be required as part of the land assessment process; quantitative analysis of current GRSG seasonal habitat conditions of allotments is not available and is likely to change over time, based on precipitation level and other factors.

Modifications to grazing systems could be required to meet seasonal habitat objectives, increasing costs to lessees and permittees. Over time, this could also reduce permitted active use AUMs on BLM-administered lands, as discussed under Alternatives B, D, and E. Acres within nesting habitat may be more likely to require changes to grazing management, due to the desired conditions for this habitat type. Impacts would occur on an allotment scale as permit renewal and related management changes were implemented. The level and intensity of impacts would vary on a site-specific basis.

Management for riparian and wetlands areas would be similar to that described under Alternative B, with additional measures to protect or improve habitat potentially requiring changes to grazing system management, at increased time and cost for permittees and lessees.

As discussed under Alternative D, modifications may be required to structural range improvements for GRSG protection. The Proposed Action would require additional fencing, with approximately 39 miles of fence in 13 key RNAs and an additional 800 acres fenced next to 9 key RNAs. Fences could impact the ability to distribute livestock, at additional cost to permittees and leases. Similarly, modifications to existing water improvements and limitations on new water improvements may represent some additional limitations, and costs may occur to permittees and lessees; however, the ability to distribute livestock should generally be maintained, and impacts should be limited from these actions.

Under the Proposed Plan, similar to other alternatives, voluntary relinquishment of grazing permits and leases would be permitted. The BLM may determine if relinquished permits and leases and associated allotments should remain available for livestock grazing or be used for other resource management objectives, in accordance with WO IM 2013-184. This may result in some reduction of overall available AUMs, but relinquishment is likely to remain uncommon.

Impacts from Recreation Management

Impacts from recreation would be the similar to Alternative B. The Proposed Plan also restricts the construction of recreation facilities unless a net conservation gain would result. It requires an assessment of SRMAs for consistency with the Adaptive Management Strategy (**Appendix D**). Restrictions would further limit disturbance to livestock and livestock forage from recreation, as discussed under *Nature and Type of Effects*.

Impacts from Travel Management

Under the Proposed Plan travel management plans would be implemented within 5 years, as described under Alternative B, C, D, and E. Under the Proposed Plan PHMA and GHMA would be designated as limited to existing roads unless already designated as limited or closed, as described in Alternative C. Specific implementation level criteria to protect GRSG would also be applied, further limiting new roads and volume of traffic on new and existing roads. As a result, disturbance of livestock from recreation traffic would be reduced, as compared with Alternative A. Under the Proposed Plan, temporary closures would also be permitted, as necessary for resource protection. Closures would further reduce disturbance to livestock and could increase livestock forage if reclaimed, but the could impact the ability of permittees and lessees to access allotments and livestock.

Impacts from Lands and Realty Management

Under the Proposed Plan, the BLM would manage a similar number of exclusions for major and minor ROWs as Alternative A. However, 3 million acres would be exclusion for solar and wind ROWs. In addition PHMA and GHMA (9.9 million acres, nearly three times more than Alternative A) would be avoidance for major and minor ROWs. New ROWs would be collocated with existing disturbance when possible.

The Proposed Plan would include a cap on human disturbance; the 3 percent disturbance cap on discrete human disturbances would be applied in PHMA at both the Oregon PAC (also known as BSU) and project levels. Human disturbances in PHMA and GHMA would be mitigated to ensure a net conservation gain to GRSG. In addition, conservation measures would be implemented in PHMA and GHMA, such as adaptive management and defined monitoring protocols (**Appendices D and G**), RDFs (**Appendix C**), and lek buffers (**Appendix S**). As a result, indirect disturbance of livestock grazing or livestock forage from ROW development could be reduced, as compared with Alternative A.

4.9 RECREATION**4.9.1 Methods and Assumptions*****Indicators***

Indicators of impacts on recreation are as follows:

- Changes to patterns or levels of visitor use
- Increases in requests for SRPs between March 1 and June 30
- Management actions that result in long-term elimination or reduction of basic recreation and visitor services and resource stewardship needs

Assumptions

The analysis includes the following assumptions:

- The demand for general recreation on BLM-administered and National Forest System lands would continue to increase over the life of the Resource Management Plan and the Land and Resource Management Plan.
- Outdoor recreation will continue to be an important component of the local economy.
- Management actions to preserve GRSG habitat would affect a variety of resources and uses, which would generally improve recreation opportunities and experiences.
- Outside of SRMAs, the BLM will manage for recreation that consists mostly of dispersed activities, where users informally participate in activities individually or in small groups.
- Demand for SRPs will remain steady or gradually increase over time.
- The BLM will continue to issue SRPs on a discretionary basis.

4.9.2 Nature and Type of Effects

This section analyzes potential impacts on recreation resources from proposed management actions of other resources and resource uses. Existing conditions concerning recreation are described in **Section 3.9**, Recreation.

Direct impacts on recreation are those that affect opportunity, including the opportunity for access and to engage in specific activities. Indirect impacts are those that alter the physical, social, or administrative settings. Impacts on settings can either be the achievement of a desired setting or the unwanted shift in setting, such as to either a more primitive or urban environment. Physical, social, and administrative settings are not specifically managed for in areas not designated as Recreation Management Areas, although these areas do still provide intrinsic recreation values and opportunities.

The indicator typically used to describe impacts is the availability of opportunities, as described by either acreage restrictions or specific activity prohibitions. This applies to the SRP program, where an indicator of impacts is any change in how and whether SRPs are issued.

This discussion analyzes the impacts that proposed management decisions would have on managing recreation, recreation opportunities, and the SRP program. Visitor use patterns are difficult to estimate and depend on many factors beyond the scope of management (e.g., recreation trends and economy). For this reason, qualitative language—for example, “increase” or “decrease”—is used to describe anticipated impacts.

Implementing management for the following resources would have negligible or no impact on recreation for all alternatives; therefore, they are not discussed in detail:

- Special Status Species—GRSG
- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Lands and realty
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Special designations
- Air quality and climate change
- Special status plants

4.9.3 Impacts Common to All Alternatives

All alternatives involve controlling major ground disturbances, such as livestock grazing, mining, and ROWs. Due to the limited scale of rockhounding ground disturbing activities, limitations on major surface disturbing activities would not diminish opportunities for rockhounding activities to continue. There would be no impacts on rockhounding.

4.9.4 Alternative A

Impacts from Recreation

Under Alternative A, existing recreation opportunities in the planning area would be maintained over the long term.

Impacts from Travel and Transportation Management

Under Alternative A, existing motorized recreation opportunities in the planning area would be maintained over the long term.

4.9.5 Alternative B

Impacts from Recreation

Restricting issuance of SRPs in PHMA to those activities that have neutral or beneficial impacts on PHMA would likely result in many SRPs being relocated or made subject to conservation measures and seasonal restrictions. This could reduce the types of organized recreation activities allowed via SRPs in PHMA over the long term.

Impacts from Travel and Transportation Management

Limiting motorized travel to existing routes in PHMA and GHMA and establishing seasonal road closures would reduce the areas available for cross-country motorized exploration in the decision area over the long term. Antler hunters using motorized vehicles would not be able to leave existing routes to search for or retrieve antlers in PHMA. Big game hunters would need to retrieve game by foot or mechanized means (e.g., game carts) instead of using OHVs. Seasonal closures in PHMA would restrict motorized travel on specific roads during the GRSG breeding season.

Limits on road construction in PHMA would result in a long-term reduction in new opportunities for motorized recreation. This could result in localized congestion and user conflicts if motorized travel were to increase in popularity.

4.9.6 Alternative C

Impacts from Recreation

Impacts are the same as those under Alternative A.

Impacts from Travel and Transportation Management

Impacts are the same as those under Alternative A.

4.9.7 Alternative D

Impacts from Recreation

Adding stipulations to SRPs to protect GRSG and their habitat would likely result in many SRPs being relocated or made subject to conservation measures and seasonal restrictions. This would result in a long-term shift in the way SRPs are issued in the planning area. SRPs most likely to be affected are those for wilderness therapy, outdoor education, equestrian events, and organized motor vehicle events. It also includes other activities that occur during spring and summer, when they would need to avoid GRSG nesting and lekking. Hunting outfitters may be less affected because there are fewer sensitive concerns for GRSG during the fall hunting season. Likewise, rafting outfitters on rivers, and river corridors may be less affected because core GRSG habitat, and its associated restrictions on SRPs, does not include river use.

Impacts from Travel and Transportation Management

Impacts are the same as those under Alternative B.

4.9.8 Alternative E***Impacts from Recreation***

The BLM would attempt to reduce seasonal disturbances to GRSG and their habitat through a variety of means, including implementing conservation measures, establishing seasonal restrictions, and relocating activities subject to SRPs. This would likely result in limited impacts on recreation because activities would not be prohibited. However, if alternative means of protecting GRSG and their habitat were ineffective, the BLM may implement seasonal closures of roads and areas; this would limit recreation opportunities to other parts of the decision area.

Impacts from Travel and Transportation Management

Restricting motorized use near leks during breeding season (approximately March 1 through July 15) would seasonally limit opportunities for motorized recreation in certain parts of the decision area. Hunting would be largely unaffected because the restrictions would not overlap big game hunting season.

4.9.9 Alternative F***Impacts from Recreation***

Impacts from SRP management are the same as those under Alternative B. Seasonally prohibiting camping and other nonmotorized recreation within four miles of a lek would force those activities to be moved elsewhere in the decision area.

Impacts from Travel and Transportation Management

Prohibitions on new road construction and road upgrades in occupied GRSG habitat would result in a long-term reduction in new opportunities for motorized recreation.

4.9.10 Proposed Plan***Impacts from Recreation***

The BLM would seasonally restrict SRPs in PHMA and GHMA and within 4.0 miles of an occupied or pending lek, depending on the type of SRP. This would seasonally limit different types of organized and group activities in these portions of the planning area over the long term and would force groups and outfitters to look elsewhere for these opportunities.

Diverting concentrated use and recreation facilities away from PHMA would result in a long-term shift in recreation patterns in the planning area. By concentrating use in other areas, there is an increased risk of user conflict and crowding; however, this risk is considered minimal, considering the size of the

planning area and current and projected recreation use trends. Impacts from the 3 percent surface disturbance cap on human disturbances and the net conservation gain requirement would have a similar effect on recreation by limiting the size and placement of recreation facilities in PHMA.

Seasonal restrictions in existing SRMAs in PHMA and GHMA would force users to recreate elsewhere in the planning area during the time of year when restrictions are in place. Effects on users would be similar to those described for outfitters and groups, above.

Impacts from Travel and Transportation Management

Eliminating cross-country OHV travel in PHMA and GHMA would result in a long-term loss of unregulated, cross-country, motorized access on 2,670,351 acres. It would increase the acreage available to existing roads, primitive roads, and trails to 7,996,165 acres. Limiting OHV travel to existing roads, primitive roads, and trails (except where already closed) would preserve access, though users desiring cross-country opportunities may be forced to look elsewhere in the planning area or outside it.

Limiting route construction and realignment in PHMA and GHMA and within 4.0 miles of occupied or pending leks may result in long-term reductions in access and in road, primitive road, and trail quality. This effect would be minimized due to the dispersed travel patterns and density in the planning area.

RDFs and BMPs for roads and travel management would be the same under Alternatives B, C, D, and F and the Proposed Plan and would likely limit the number of routes in GRSG habitat. However, they would enhance the long-term quality of routes available for public and permitted use by requiring design features to ensure routes accommodate their anticipated uses. Best practices for decommissioning routes would likewise direct recreationists to better quality routes that remain open for use.

Seasonal route and area closures implemented via authorities in the Code of Federal Regulations are specifically outlined in the Proposed Plan, but they would also be available to the BLM under all alternatives whenever circumstances dictate. These closures would result in short-term loss of access, but they may improve recreation opportunities over the long term by allowing roads, primitive roads, and trails to return to an improved condition if they are rehabilitated during the closure period. It may also direct users to other routes and areas better equipped to provide desirable opportunities.

4.10 TRAVEL MANAGEMENT

4.10.1 Methods and Assumptions

Indicators

Indicators of impacts on travel management are as follows:

- Change in the types of transportation activities occurring on routes that would impact GRSG or its habitat
- Change in the acreages designated as open, limited, or closed to motorized travel
- Change in the number of acres where new authorized road development would be allowed

Assumptions

The analysis includes the following assumptions:

- The demand for general access to travel routes would continue to increase over the life of the RMP.
- Administration of updated agency travel management policy, rules, and planning and design guidelines will change public land travel systems through planning and design, making them more sustainable and minimizing potential impacts on resources.
- The designation of individual routes is an implementation-level process and is not considered as part of a planning level process.
- Travel management planning can be carried out in conjunction with an RMP process or it can be deferred.
- The BLM has the authority to provide reasonable access for permitted and contracted services and would include acknowledgement of this type of access in the provisions of the permit or contract.
- Decisions in the RMP would not affect traffic and access on roads administered by other entities, including state and federal highways.
- Travel systems are dynamic and will be changed through subsequent implementation level planning efforts in order to respond to the needs of the BLM multiple-use mission.
- Implementation of a travel management plan includes: increased public education, notification by use of signs, enforcement, resource monitoring in regard to travel management, and the designation of roads, primitive roads, and trails

4.10.2 Nature and Type of Effects

This section discusses impacts on travel and transportation management from proposed BLM management actions. (Existing conditions concerning travel and transportation management are described in **Section 3.10**, Travel and Transportation Management.) Travel and transportation management supports and helps achieve the objectives of other resource programs. Consequently, the travel designations would adhere to the management prescriptions included under each alternative, while following the theme of each alternative.

At the resource management planning level, impacts on travel and transportation management are those that restrict travel, such as managing areas as open, closed or limited to motorized travel, more specifically, to off-road vehicles (ORVs), as defined in 43CFR8342.0-5(a), and limiting seasonal travel.

For the purposes of this analysis, the terms ORV and OHV are used synonymously, the OHV being the more preferred term.

New travel and transportation management actions in response to GRSG habitat protection strategies would impact the number of acres where motorized ORV (or OHV) travel is allowed.

Travel management decisions in terms of "areas" as described in 43 CFR, Part 8342.1 address minimization criteria a-d, which include;

- (a) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
- (b) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.
- (c) Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
- (d) Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the BLM Authorized Officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

Throughout Chapter 4, the reader will find numerous locations and disciplines where these minimization criteria have been analyzed, including, but not limited to, travel management, recreation, vegetation, wildlife (including GRSG), and invasive plants. In addition, many of the BMPs and RDFs in **Appendix C** have been formulated to minimize impacts where they may occur.

Travel management decisions that benefit GRSG may impact other resources and uses, such as limiting travel to existing routes, or seasonally restricting use near lek sites during GRSG breeding season. As such, impacts of travel management actions on other resources and uses are discussed in the respective resource sections of this chapter. Impacts from travel management

planning do occur and are considered a part of implementation level planning that will be completed during site-specific analysis.

Implementing management for the following resources would have negligible or no impact on travel management for all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Lands and realty
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Special designations
- Air quality and climate change
- Special status plants

4.10.3 Impacts Common to All Alternatives

Impacts from Travel Management

The BLM will complete a travel management plan within 5 years or as funding allows. Until that time the public may access existing routes as described in **Chapter 3**. The decision to create new routes or close existing routes will occur during the travel management plan stage and will be subject to NEPA analysis.

Routine maintenance is conducted on all roads, routes, and trails. This would continue under all of the alternatives. There would be no impacts on travel management from routine maintenance.

All alternatives allocate BLM-administered lands as open, closed, or limited for OHV travel. These allocations are analyzed throughout Chapter 4 in regard to their impact on the resources listed in the minimization criteria found in 43 CFR, Part 8342.1. For example, the impact of OHV allocations on vegetation can be found in Section 4.4, Vegetation.

4.10.4 Alternative A

Impacts from Travel Management

Under Alternative A, existing travel opportunities in the planning area would be maintained over the long term. Approximately 6,811,900 acres in the planning

area would remain open to unrestricted cross-country motorized travel; approximately 5,325,400 acres would remain limited to existing routes; and approximately 300,300 acres would remain closed to motorized use.

ACECs and RNAs currently open to OHV use would remain so, and access would continue to be unaffected.

4.10.5 Alternative B

Impacts from Travel Management

A shift in OHV designations would reduce cross-country motorized travel opportunities. Compared with Alternative A, there would be 2,670,400 fewer acres open to cross-country motorized travel and in these areas motorized travel would be limited to existing routes. However, this is not expected to noticeably increase congestion or conflict over the long term because the existing route network is well dispersed throughout much of the decision area.

There would be no new limits on new road construction in PHMA, meaning the BLM would have more flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity.

4.10.6 Alternative C

Impacts from Travel Management

Designations of acres open, closed, and limited for motorized travel would be the most restrictive of any alternative. Compared with Alternative A, there would be 5,609,196 fewer acres open to cross-country motorized travel, and motorized travel would be limited to existing routes in these areas. However, this is not expected to noticeably increase congestion or conflict over the long term. This is because the existing route network is well dispersed throughout the decision area.

There would be no new limits on new road construction in PHMA, meaning the BLM would have more flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity.

4.10.7 Alternative D

Impacts from Travel Management

Impacts are the same as those under Alternative B except that this alternative would reduce, limit to existing and designated roads, or close all OHV use in identified ACECs in GRS habitat. Alternative D would also close all identified RNAs to OHV use. These actions would result in localized reductions in motorized access that would be most pronounced in larger ACECs and RNAs because entire landscapes could be limited or off-limits for motorized vehicles.

4.10.8 Alternative E

Impacts from Travel Management

Compared with Alternative A, there would be 2,899,200 fewer acres open to cross-country motorized travel. While there would be 25,400 fewer acres closed to motorized travel than under Alternative A, there would also be 2,899,200 fewer acres open to cross-country motorized travel. This would result in more acres where motorized travel is limited to existing routes. This change in motorized travel designations is not expected to noticeably increase congestion or conflict over the long term because the existing route network is well dispersed throughout the decision area.

Prohibiting motorized use within 2 miles of leks during breeding season (approximately March 1 through July 15) would seasonally limit access in certain parts of the decision area. Because the restrictions would be localized and temporary, long-term impacts on travel management would be negligible. Recommending no new development in Core Area habitat where there is evidence of GRSB presence would result in fewer expansions and upgrades to the transportation system in those parts of the decision area. Because the existing route network is well dispersed throughout the decision area, impacts are negligible.

4.10.9 Alternative F

Impacts from Travel Management

Impacts from open, closed, and limited designations for motorized travel would be the same as under Alternative B. Prohibiting new road construction within 4 miles of active GRSB leks could result in localized congestion and user conflicts if motorized travel were to increase in popularity.

4.10.10 Proposed Plan

Impacts from Travel Management

Impacts from open, closed, and limited designations for motorized travel would be the same as under Alternative B. Limitations on route construction and realignment and upgrades to primitive roads mean the BLM would have less flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity. Eliminating parallel roads travelling to the same destination when the destination can be accessed from the same direction and topography in PHMA and GHMA would have negligible impacts on access because destinations would still be accessible. Impacts from the 3 percent surface disturbance cap on human disturbances and the net conservation gain requirement would have a similar effect on travel management by limiting the placement of routes in PHMA.

RDFs and BMPs for roads and travel management would be the same under Alternatives B, C, D, and F and the Proposed Plan. They would likely limit the number of routes in GRSG habitat. However, they would enhance the long-term condition of routes available for public and permitted use by requiring design features to ensure routes accommodate their anticipated uses. Best practices for decommissioning routes would likewise direct traffic to higher quality routes that remain open for use and will adequately facilitate access over the long term.

4.11 LANDS AND REALTY

BLM-administered lands are used for a variety of purposes. Major focus areas for the lands and realty program include land use authorizations, land tenure adjustments, and land withdrawals.

This section discusses impacts on lands and realty from proposed management actions of other resources and resource uses. Existing conditions concerning lands and realty are described in **Section 3.11**.

4.11.1 Methods and Assumptions

Indicators

Indicators of impacts on lands and realty are as follows:

- Acres of surface ownership, which includes federal surface with private minerals, in the planning area
- Acres of surface ownership affected by ROW restrictions (e.g., avoidance or exclusion areas)
- Number and type of land tenure adjustments (i.e., lands identified as suitable for disposal, withdrawal, or acquisition)
- Number and types of surface-disturbing ROWs and leases, including communication sites

Assumptions

The analysis includes the following assumptions:

- Authorized ROWs and communication sites would be managed to protect valid existing rights, as long as those ROWs are in compliance with the terms and conditions of their grant.
- On renewal, assignment, or amendment of existing ROWs, permits, and leases, additional stipulations could be included in the land use authorization.
- Activities on dispersed private parcels within the planning area would continue to require new or upgraded services for small distribution facilities, including communication sites, roads, and utilities.

- Power lines and other vertical structures located in areas naturally devoid of perching opportunities provide a perch for raptors and subsequently increase the potential for GRSG to abandon leks (Ellis 1984; Howe et al. 2014). However, Walters et al. (2014) found little empirical evidence to isolate the effects of the tallness of structures from other potentially confounding effects. Mitigation in the form of burying lines or including nonperching design features on lines would reduce perching opportunities and subsequent impacts on GRSG (Connelly et al. 2000b; Oles 2007).
- The demand for both energy and nonenergy types of ROWs (including communication sites) is anticipated to remain steady or to gradually increase over time.
- Little to no solar energy ROWs are anticipated due to low solar energy potential.
- The number of ROW authorizations related to geothermal energy is anticipated to be less than those for wind.
- Maintaining and upgrading utilities, communication sites, and other ROWs is preferred before the construction of new facilities, but only if the upgrading can be accommodated within or directly adjacent to the existing ROW.
- Demand for small distribution facilities to extend and upgrade services, such as communication sites and utilities, is anticipated to increase as rural development occurs on dispersed private parcels within the planning area.
- The number of ROW applications for new communication and computer technology, such as fiber optic cable, is anticipated to continue to increase.
- Demand for both regional and interstate transmission lines is anticipated to increase as population and urban areas grow and as new energy generation facilities, such as wind, are developed throughout Oregon.
- Collocation of new infrastructure in existing ROWs is preferred over creating a new ROW. The BLM recognizes that collocation does not eliminate the likelihood for new temporary or permanent surface disturbance.
- The BLM would continue to manage all previously withdrawn lands as withdrawn from entry, appropriation, or disposal under the public land laws. Withdrawals would be reviewed as needed and recommended for extensions, modifications, revocations, or terminations. All existing withdrawals initiated by other agencies, such as the Bureau of Reclamation or the Department of Energy, would be continued consistent with existing terms.

- Any lands that become unencumbered by withdrawals or classifications will be managed according to the decisions made in this RMPA. If the RMPA has not identified management prescriptions for these lands, they will be managed in a manner consistent with adjacent or comparable public lands within the decision area. If the unencumbered lands fall within two or more management scenarios where future planning criteria may not be clear, a plan amendment may be required.
- The existing designated ROW corridors within the decision area include the Western Utility Group updates to the Western Regional Corridor Study, Section 368 Energy Policy Act of 2005, and West-wide Energy Corridor Programmatic EIS. All of these are adopted and carried out under BLM IM-2013-118 (dated April 12, 2013). Designated transportation and utility corridors include linear ROWs, but are not limited to electric transmission facilities, pipelines, communication lines, and transportation systems.

4.11.2 Nature and Type of Effects

Resources and resource uses affect the lands and realty program by prescribing ROW exclusion and avoidance areas and stipulations in order to protect resources. A ROW exclusion area is one that is not available for a new ROW under any conditions. In ROW avoidance areas, ROW applications could be submitted, but a project proposed in these areas would be subject to additional requirements. Examples of the additional requirements are resource surveys and reports, construction and reclamation engineering, long-term monitoring, special design features, special siting requirements, timing limitations, and rerouting. Such requirements could restrict project location, delay availability, limit future access, or increase the cost of energy supply or communications service availability (by delaying or restricting construction of pipelines, transmission lines, communication infrastructure, or renewable energy projects). As a result of special surveys and reports, alternative routes may need to be identified and selected to protect sensitive resources, such as GRSG habitat.

Unless specific management is proposed for renewable energy ROWs, for example in the Proposed Plan, which manages certain counties as open to new wind energy development, the management of GRSG habitat as ROW exclusion and avoidance areas would decrease the BLM's ability to accommodate new wind and solar energy development. Since much of Oregon's wind energy resource potential is in GRSG habitat (NREL 2009a), ROW restrictions that cover the entire decision area would decrease wind energy development potential statewide. Impacts on industrial-scale solar energy development would be less than on wind due to lower solar energy potential in the planning area (NREL 2005). Management of areas as avoidance for new renewable energy development would deter, but not prohibit, future development. New wind

energy development applications in avoidance areas would likely incur added costs, more complex project designs, and longer BLM processing times.

Collocating transmission and mineral development infrastructure in existing ROWs and disturbed areas reduces land use conflicts and additional land disturbance. Collocation policies also clarify the preferred locations for utilities and simplify processing on BLM-administered lands. However, collocating can limit options for mineral development and selection of more preferable locations for ROWs. In addition, collocation may not always be feasible, such as in the situation where the safety clearances needed by previously constructed energy transmission infrastructure are such that no further room is available within the footprint of the existing ROW.

Resource management planning can involve closing areas to motorized or mechanized travel and limiting the construction of new routes. Travel management planning can result in more specific route closures, seasonal restrictions, and travel mode limitations. Area closures and limitations on new route construction would make certain areas impractical for some types of land uses, such as transmission lines or communication sites, where access is necessary to serve the land use.

Land tenure and landownership adjustments are intended to maintain or improve the efficiency of BLM management, including management of GRSG habitat. Land tenure adjustments can result in a more contiguous decision area, thus increasing the efficiency of BLM management. However, while consolidation would be beneficial for certain resources and uses, it would not necessarily reduce effects on GRSG habitat.

Implementing management for the following resources would have negligible or no impact on lands and realty for all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate

4.11.3 Impacts Common to All Alternatives

Impacts from Recreation

Under all alternatives, BLM management goals and objectives would continue to preserve a desired setting and recreation experience for users within special recreation management areas (SRMAs). Land uses in SRMAs and developed recreation sites should not conflict with recreation uses. Under all alternatives, the BLM would continue to evaluate land use authorizations on a case-by-case basis in the special recreation areas and near recreation sites, so as to avoid conflicting uses.

4.11.4 Alternative A

Impacts from Special Status Species—GRSG Management

Existing land use plans do not contain GRSG management actions; therefore, there would be no impacts on lands and realty under Alternative A from GRSG management.

Impacts from Travel Management

Under Alternative A, existing transportation routes would continue to provide motorized access to ROW infrastructure and communication sites for construction and maintenance. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty

Land Use Authorizations

Under Alternative A, 3,445,700 acres in the planning area would continue to be managed as ROW avoidance areas, and 857,600 acres would continue to be designated as ROW exclusion. Within exclusion areas, new ROW development would continue to be prohibited, which would prevent the lands and realty program from approving new applications within these areas. Within avoidance areas, the BLM would require ROW applicants to adhere to special conditions, such as siting criteria and design requirements. These requirements would discourage new ROW development in avoidance areas. All other lands within the planning area would continue to be open for ROW development. Alternative A would allow the BLM to accommodate future demand for ROW development within the planning area over the long term.

BLM-administered lands would continue to be available for multiple-use and single-use communication sites, utilities, and road access ROW authorizations on a case-by-case basis (Title V of FLPMA and 43 CFR, Part 2800). All ROW applications would be reviewed using the criteria of collocating new ROWs within or next to existing ROWs wherever practical to avoid the proliferation of separate ROWs.

Therefore, there would be little to no short- or long-term impacts on ROW development under Alternative A.

Land Tenure

Under Alternative A, the BLM would continue to manage 12,618,000 surface acres in the planning area. This includes 9,170,900 acres in Zone I (areas with high resource values and identified for retention); 3,299,200 acres in Zone II (areas with moderate resource value and areas identified for retention or possible exchange); and 138,800 acres in Zone III (areas identified for possible disposal due to lesser resource values or scattered ownership). Land tenure management under Alternative A would allow the BLM to dispose of lands as necessary to improve management efficiency. Land tenure adjustments would continue to be subject to the disposal and acquisition criteria in the existing resource management plans.

Withdrawals

There would continue to be 550,100 acres of land withdrawals in the planning area.

Impacts from Special Designations

Under Alternative A, 715,049 acres would be managed as ACECs. Those applying for ROWs proposed within ACECs could experience longer processing times, stipulations on available development locations, and additional design standards. Refer to **Section 4.16**, Special Designations, for further analysis.

4.11.5 Alternative B

Impacts from Special Status Species—GRSG Management

Management actions under Alternative B to protect GRSG habitat would impact the lands and realty program. Primary impacts under Alternative B would result from the designation of additional ROW exclusion areas, compared with Alternative A. In exclusion areas, the BLM would be prohibited from approving new ROW development. In avoidance areas, development would be allowed only if certain siting and design requirements could be met. ROW restrictions under Alternative B would substantially reduce the ability of the BLM to accommodate demand for the following:

- Interstate and intrastate gas pipelines and electric transmission lines
- Wind and solar energy development
- Fiber optic lines
- Communication sites
- Local electric distribution and fiber optic and cable lines
- Residential and farm access ROWs

Impacts from Travel Management

Alternative B would limit motorized travel to existing roads and trails in PHMA (4,498,600 acres) and GHMA (2,576,800 acres). This could result in additional time of use or vehicle restrictions on certain routes. The BLM would continue to manage 48,500 acres in PHMA and 143,600 acres in GHMA as closed to motorized travel. Restrictions on travel access could complicate maintenance on existing ROW infrastructure during certain times of the year. Restrictions also could discourage ROW development where access would be limited. Any restrictions would be subject to valid existing rights. The Lands and Realty program could see an increase in ROW applications with road closures. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty Management***Land Use Authorizations***

Under Alternative B, PHMA (4,547,000 acres) would be designated as ROW exclusion. The BLM would not authorize new ROWs in PHMA unless the infrastructure could be located entirely within an existing ROW footprint. Additionally, GHMA (5,662,600 acres) would be designated as ROW avoidance areas. As noted in **Section 4.11.2**, *Nature and Type of Effects*, managing GRSG habitat as ROW exclusion would prevent the BLM from accommodating new ROW development in those areas.

There is a continuing demand for new ROWs in the planning area, including major interstate and intrastate electrical transmission, gas pipelines, industrial-scale wind energy development, and communication ROWs. Because of restrictions on BLM-administered lands, developments would be diverted to adjacent nonfederal lands or they would be prevented altogether. Development on adjacent lands could result in long-term direct and indirect impacts on the BLM Lands and Realty program (e.g., increased interest in collocating infrastructure in existing ROWs crossing BLM-administered lands). This would be the case especially if the development were close to GRSG habitat on BLM-administered lands. If new linear ROW development, particularly interstate electrical transmission, fiber optic, and gas pipelines, could not be feasibly developed due to ROW exclusions on BLM-administered lands in the planning area, then energy and communication developers would need to seek alternative routes or technologies.

Within avoidance areas, the BLM would continue to process ROW applications but would apply supplemental design criteria or siting limitations to any new ROW authorizations in these areas. Conditions on new ROW authorizations in avoidance areas would decrease the amount of future ROW development. Conditions and limitations on ROWs in PHMA and GHMA could result in an increase in trespass.

Additionally, under Alternative B, the BLM would take advantage of opportunities to remove, bury, or modify existing power lines. Limitations on new ROWs and aboveground linear features, such as transmission lines and pipelines, could restrict energy or service availability and reliability for communication systems.

Land Tenure

Under Alternative B, the BLM would designate 10,220,400 acres as Zone I or as lands identified for retention. Retention lands in PHMA would increase by 1,049,500 acres, compared with Alternative A. The BLM would retain ownership of public lands in PHMA; however, exceptions may occur where land exchanges would result in more contiguous federal ownership patterns or where disposal accompanied by a habitat mitigation agreement or conservation easement would result in more effective management of PHMA lands. Impacts would be consistent with those described in **Section 4.11.2, *Nature and Type of Effects***.

Withdrawals

Under Alternative B, the BLM would not recommend land withdrawals for reasons other than mineral activity. Impacts on mineral development are described in Sections 4.12-4.15.

Impacts from Special Designations

Impacts from ACECs on lands and realty are the same as those for Alternative A.

4.11.6 Alternative C

Impacts from Special Status Species—GRSG Management

Management actions under Alternative C to protect GRSG habitat would impact lands and realty through the designation of all PHMA and GHMA (10,682,100 acres) as ROW exclusion. Compared with Alternative A, Alternative C would result in a 1,100 percent (9,824,600-acre) increase in ROW exclusion area. It would entail the most ROW restrictions of any alternative, preventing the BLM from accommodating demand for new transmission lines, gas pipelines, communication sites, wind energy facilities, and other types of ROWs. Additional management prescriptions for land tenure and road construction would further constrain BLM lands and realty program functions in GRSG habitat.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative C are the same as those under Alternative A. Refer to **Section 4.10, Travel and Transportation Management**, for further analysis.

Impacts from Lands and Realty Management

Land Use Authorizations

Under Alternative C, 10,682,100 acres in the planning area would be designated as ROW exclusion area. The BLM would not authorize new ROWs in PHMA or GHMA unless the infrastructure could be located in an existing ROW. Alternative C would eliminate opportunities for communication facilities, gas pipelines, fiber optic cables, electrical transmission lines, access roads, wind and solar energy production facilities, and similar ROW development in GRSG habitat. There is a continuing demand for many of these ROWs in the planning area to meet energy and communication needs within and outside the planning area. Alternative C would reduce or eliminate the ability of the BLM lands and realty program to meet those needs. An indirect long-term effect could be an increase in trespass.

Designation of all GRSG habitat as exclusion for wind and solar energy ROWs would eliminate the BLM's ability to accommodate new renewable energy development in the planning area. It would hinder the BLM's ability to meet President Obama's energy goal of 10 gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). ROW exclusions would also inhibit wind energy development on adjacent nonfederal land where transmission infrastructure would be needed across BLM-administered lands.

Land Tenure

Under Alternative C, all PHMA and GHMA would be designated as Zone I; therefore, the BLM would retain public ownership of 11,757,100 acres in GRSG habitat with no exceptions. While land tenure management under Alternative C would improve management of GRSG habitat, it would prevent the BLM from disposing of lands (e.g., isolated parcels) to improve management efficiency. Designating land as Zone I also eliminates the ability to resolve any trespass on such land by means of a sale by the BLM of the affected land. Impacts would be consistent with those described in **Section 4.11.2**.

Withdrawals

Impacts on lands and realty from land withdrawals are the same as under Alternative A.

Impacts from Special Designations

Under Alternative C, the BLM would manage all PHMA as new ACECs, equivalent to 4,547,000 acres. Management for the ACECs would be tailored to protect the relevant and important values (i.e., GRSG habitat) for which the ACECs would be designated. Since BLM management for lands and realty under Alternative C would exclude ROW development in PHMA and GHMA, the designation of PHMA as ACECs would not add further ROW restrictions. Under Alternative C, infrastructure development and other ROWs would be directed to adjacent BLM-administered lands or to private lands, resulting in an

overall reduction in new land use authorizations. New land use authorizations would be further reduced if ROW applicants could not find suitable alternative development locations outside ACECs. Refer to **Section 4.16**, Special Designations, for further analysis.

4.11.7 Alternative D

Impacts from Special Status Species—GRSG Management

Management proposed under Alternative D would enable the BLM to accommodate ROW development in GHMA. It would allow opportunities for new ROWs in PHMA subject to avoidance criteria. Although the BLM would consider new applications for ROWs in avoidance areas, a 200 percent increase in avoidance areas, when compared with Alternative A, would limit the BLM's ability to grant certain ROWs. This would reduce the total number of ROWs authorized in GRSG habitat over the long term.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative D are the same as those under Alternative B. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty Management

Land Use Authorizations

ROW exclusion areas in PHMA and GHMA under Alternative D would be the same as under Alternative A. In PHMA, 4,289,900 acres, including areas within existing corridors, would be managed as ROW avoidance for all ROW types unless new disturbance falls under the 3 percent disturbance cap or as a result of mitigation results in no net loss of GRSG habitat. Examples of mitigation include burying electrical transmission lines and revegetating a decommissioned roadway. While burying an electrical transmission line creates short-term surface disturbance, the long-term direct (e.g., surface disturbance) and indirect (e.g., vehicle use on adjacent roads for maintenance) effects of a buried line on GRSG habitat and populations are less compared with impacts from an overhead line.

ROW avoidance areas in GHMA would be the same as under Alternative A.

Alternative D would directly impact the lands and realty program by reducing the BLM's ability to authorize new ROWs in PHMA that would not be able to meet specified criteria (e.g., the 3 percent disturbance cap threshold). Within avoidance areas, additional stipulations for the development of electrical transmission lines could result in the denial of projects that cannot meet ROW grant requirements for the protection of GRSG habitat. Limitations on electrical transmission line development and new roadways under Alternative D would be similar to Alternative C and would be consistent with **Section 4.11.2**.

Impacts on other types of ROWs, such as communication sites, fiber optic lines, gas pipelines, wind and solar energy generation facilities, and water infrastructure, would result only in the following cases:

- When a ROW applicant could not find a suitable location outside avoidance or exclusion areas
- When a ROW applicant could not meet the ROW grant requirements if proposed within avoidance areas

For communication facilities, stipulations in avoidance areas could diminish the effectiveness of the communication infrastructure to the point where the development would not be practical. This would result in a direct impact on that type of infrastructure development and would reduce overall communication services. Reducing overall communication services could also have an adverse impact on public health and safety.

Land Tenure

Management and associated impacts would be the same as Alternative B.

Withdrawals

There would be no impacts from withdrawals under Alternative D.

Impacts from Special Designations Management

Management and associated impacts would be the same as Alternative A.

4.11.8 Alternative E

Impacts from Special Status Species—GRSG Management

Impacts on lands and realty under Alternative E from management actions to protect GRSG are the same as Alternative B.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative E are the same as Alternative B, except Alternative E provides more spatial definition of seasonal road closures. Specifically, roads within 2 miles of an active lek would be subject to seasonal closures. Seasonal limitations on access in the 2-mile lek buffer areas would make certain ROW development impractical in those areas. This would reduce new ROW development in or next to buffer areas. Any restrictions would be subject to valid existing rights. Refer to **Section 4.10**, Travel and Transportation Management, for further analysis.

Impacts from Lands and Realty Management

Land Use Authorizations

Under Alternative E, Core Area habitat (4,547,000 acres) would be designated as ROW exclusion. New infrastructure would be prohibited in Core Area habitat unless the infrastructure could be collocated in an existing ROW.

Limitations on new infrastructure outside existing ROWs and ROW stipulations for avoidance areas would prevent the BLM from accommodating additional demand for ROW development within GRSG habitat. With the expected demand for new ROWs in the planning area, particularly interstate and intrastate electrical transmission lines, wind energy facilities, and gas pipelines, new ROW development could be diverted to adjacent nonfederal lands, increasing sagebrush cover loss and habitat fragmentation on nonfederal land within GRSG habitat. The BLM Lands and Realty program would be indirectly impacted by ROW congestion from collocation of ROWs on BLM-administered lands. If new ROW development could not be feasibly developed, there would be a reduction in energy and communication development opportunities needed to meet growing demand.

Land Tenure

Management and associated impacts would be the same as Alternative A.

Withdrawals

Management and associated impacts would be the same as Alternative A.

Impacts from Special Designations Management

Management and associated impacts would be the same as Alternative A.

4.11.9 Alternative F

Impacts from Special Status Species—GRSG Management

Management actions under Alternative F to protect GRSG habitat would be similar to Alternative B and consistent with **Section 4.11.2**. ROW exclusion areas under Alternative F would restrict the BLM from accommodating demand for new transmission lines, gas pipelines, communication sites, wind energy facilities, and other types of ROWs. This could result in ROW applications being denied. With the expected ongoing demand for new ROWs in the planning area, particularly interstate and intrastate electrical transmission and gas pipeline ROW developments, new ROW development could be diverted to adjacent nonfederal lands. If new ROW development could not be feasibly developed, there would be a reduction in energy and communication development opportunities needed to meet growing demand.

Impacts from Travel Management

Impacts from travel and transportation management under Alternative F are similar to Alternative B, except that Alternative F prohibits new road construction within 4 miles of active GRSG leks and avoids any new construction within occupied habitat. Limitations on new road construction within GRSG habitat would make certain ROW development (e.g., communication sites, pipelines, and transmission lines) impractical. This would reduce new ROW development in GRSG habitat. Any restrictions would be subject to valid existing rights and travel management planning would be subject to NEPA. Refer to **Section 4.10**, Travel Management, for further analysis.

Impacts from Lands and Realty Management

Impacts under Alternative F are similar to Alternative C, except that wind energy development would be prohibited within 5 miles of active leks. In areas where the 5 mile lek buffer would extend beyond GRSG habitat areas, ROW exclusion for wind and the associated impacts described under Alternative C would apply to nonhabitat areas. The result of management actions under Alternative F would be an overall decline in energy or service availability and reliability over the long term, compared with Alternative A.

Restrictions on wind energy development would hinder the BLM's ability to meet President Obama's renewable energy goal of 10 gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). With demand for new ROWs, including wind energy developments, expected to continue and increase, new ROW development would be diverted to adjacent nonfederal lands resulting in indirect impacts on BLM-administered lands (e.g., ROW congestion from collocation of ROWs on BLM-administered lands), or would not occur at all.

Land Tenure

Management and associated impacts would be the same as Alternative B.

Withdrawals

Management and associated impacts would be the same as Alternative B.

Impacts from Special Designations Management

Under Alternative F, the BLM would manage 4,755,200 acres as 17 new ACECs, including 2,760,800 acres in PHMA and 1,492,800 acres in GHMA. Management for the new ACECs would be tailored to protect the relevant and important values (i.e., GRSG habitat) for which the ACECs would be designated. All lands within the ACECs would be managed as ROW exclusion, which would prohibit new ROW development in those areas. Under Alternative F, infrastructure development and other ROWs would be directed to adjacent BLM-administered lands or to private lands. Alternative F would result in an overall reduction in new land use authorizations. New land use authorizations would be further reduced if ROW applicants were not able to find suitable alternative development locations outside ACECs. Any restrictions would be subject to valid existing rights. Refer to **Section 4.16**, Special Designations, for further analysis.

4.11.10 Proposed Plan***Impacts from Special Status Species—GRSG Management***

The Proposed Plan would enable the BLM to accommodate future demand for ROW development while conserving and enhancing GRSG habitat, so long as the proposed development incorporates siting and design techniques to avoid impacts on GRSG or its habitat. The most notable impacts on the lands and realty program under the Proposed Plan would occur in PHMA. In addition to

managing PHMA as avoidance areas for major ROWs and exclusion for wind and solar ROWs (with exceptions; see *Wind and Solar* below), the Proposed Plan would require land use authorizations to adhere to the following:

- Comply with GRSG screening criteria
- Incorporate RDFs
- Avoid tall structures within key GRSG habitat areas
- Meet noise requirements
- Abide by lek buffer requirements
- Avoid disturbing more than 3 percent of any Oregon PAC (also known as BSU) and proposed project area

GRSG conservation management actions would increase mitigation requirements for land use authorizations, would result in more complex project designs, could exclude infrastructure placement in the most cost-effective locations, and would result in overall greater development costs. A corresponding effect could be a reduction in the number of authorization applications received for activities in PHMA (and GHMA for major ROWs) and longer, more complicated review periods for those that are proposed in PHMA. Implementing the GRSG habitat conservation management actions listed above would also place NSO stipulations on fluid mineral development in PHMA, which would further reduce the demand for new ROW development in those areas.

Less restrictive management for new minor ROWs in GHMA and all other ROW types outside GRSG habitat would allow for more ROW development, leases, and permits in those areas, compared with PHMA. However, because the Proposed Plan would still require discretionary surface-disturbing land use actions to abide by the GRSG screening criteria and would incorporate RDFs, proposed applications would incur added costs and longer, more complex project review periods. Some applicants could seek less restrictive locations outside GRSG habitat if they were not able to cost effectively meet the screening criteria requirements.

Impacts from Lands and Realty Management

Land Use Authorizations

Exclusion areas for major and minor ROWs in PHMA and GHMA under the Proposed Plan would be the same as under Alternative A. PHMA would be managed as ROW avoidance for major ROW types as long as new disturbance falls under the 3 percent disturbance cap or as a result of mitigation results in the net conservation gain of GRSG habitat. Examples of mitigation are burying an electrical transmission line or revegetating a decommissioned roadway. While burying an electrical transmission line creates short-term surface

disturbance, the long-term direct effects (e.g., surface disturbance) and indirect effects (e.g., vehicle use on adjacent roads for maintenance) of a buried line on GRSG habitat and populations are less compared with impacts from an overhead line.

The Proposed Plan would directly impact the lands and realty program by reducing the BLM's ability to authorize new ROWs in PHMA that would not be able to meet specified screening criteria (e.g., net conservation gain and RDF requirements). Within avoidance areas, additional stipulations for the development of electrical transmission lines could result in the denial of projects that cannot meet ROW grant requirements to protect GRSG habitat. Limitations on electrical transmission line development and new roadways under the Proposed Plan would be similar to Alternative C and would be consistent with **Section 4.11.2**.

The Boardman to Hemmingway transmission line project is not subject to the Proposed Plan decision to designate PHMA and GHMA as an avoidance area for high voltage transmission lines.

The Obama Administration identified this transmission project as a priority project, as part of the President's commitment to job creation and modernizing America's Infrastructure. This transmission project was one of seven projects identified for expedited permit review and federal agency coordination among an interagency Rapid Response Team for Transmission (RRTT) established to foster coordination, expedite simultaneous permitting processes and resolve permitting challenges, while ensuring appropriate environmental reviews.

The BLM is currently processing the application for the Boardman to Hemmingway transmission line project, a high-voltage transmission line, which includes alternatives through this avoidance area and GRSG habitat. The BLM is analyzing conservation measures for GRSG as part of the review process for the Boardman to Hemmingway transmission line project.

The Boardman to Hemmingway transmission line project is analyzed in detail in the cumulative impacts section of this plan.

While the Proposed Plan would impact the communication facilities if GRSG conservation measures were not met, impacts on communication services would result only when a ROW applicant could not find another suitable location or could not meet the stipulations in the avoidance areas, or the stipulations in avoidance areas would diminish the effectiveness of the communication infrastructure to the point where the development would not be practical.

Wind and Solar

BLM management of SFA and PHMA outside of SFA as exclusion areas for wind and solar, with the exception of Lake, Harney, and Malheur Counties, would

prevent the development of new utility-scale wind and solar energy generation facilities in those areas. Within the avoidance areas of Lake, Harney, and Malheur Counties, the Proposed Plan establishes a hierarchy to development opportunities, beginning with nonhabitat as the first preference, followed by poor quality GRSG habitat before considering high quality GRSG habitat.

Due to low solar energy potential in the planning area, there would be negligible to no impacts on solar energy development. Because wind resources in the planning area are sufficient to support utility-scale wind energy development, excluding wind energy ROWs would prevent the BLM from accommodating future demand in exclusion areas. However, allowing future development in Lake, Harney, and Malheur Counties would accommodate future demand since these areas contain the most developable wind resources in the state. Allowing wind energy development in these counties would also increase the BLM's ability to meet President Obama's energy goal of 10 gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013).

Demand for new transmission lines, access roads, and related ancillary features to serve new wind generation projects in Lake, Harney, and Malheur Counties, GHMA, and in nonhabitat or private lands could result in new ROW applications in PHMA. Where transmission lines, access roads, and related ancillary features would cross PHMA, management of those areas as ROW avoidance areas could deter or prevent wind energy development on lands with comparatively fewer restrictions.

Land Tenure

Land tenure actions would be allowed in GRSG habitat if they can demonstrate a net conservation gain to GRSG habitat. Allowing certain land tenure actions could create a more contiguous decision area and increase short- and long-term land management efficiency, as described in *Nature and Type of Effects*. Land exchanges or disposal to remove low-quality habitat from BLM-administered land would also increase efficiency where those lands are isolated and difficult to manage.

Withdrawals

Under the Proposed Plan, SFA would be proposed for withdrawal for locatable minerals. Recommending SFA for mineral withdrawal would decrease the overall long-term demand for ROWs to support mineral development. The recommended withdrawal would be for locatable minerals only. The BLM would maintain primary management.

Impacts from Travel Management

Impacts from travel and transportation management under the Proposed Plan are the same as those under Alternative B. Refer to **Section 4.10, Travel Management**, for further analysis.

Impacts from Special Designations Management

Management and associated impacts would be the same as Alternative A.

4.12 FLUID LEASABLE MINERALS**4.12.1 Methods and Assumptions*****Indicators***

Indicators of impacts on fluid leasable minerals are as follows:

- The amount of unleased land identified as closed to fluid mineral exploration and development
- The amount of land open to leasing subject to NSO stipulations
- The amount of land open to leasing subject to CSU or TL stipulations
- Application of COAs on fluid mineral development on leased parcels for the protection of GRSG
- Restrictions on geophysical exploration in GRSG habitat
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas

Assumptions

The analysis includes the following assumptions:

- Existing fluid mineral leases would not be affected by the closures proposed under this RMPA.
- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer. The BLM can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease or does not affect lease rights.
- Existing leases would be managed under the stipulations in effect when the leases were issued; new stipulations proposed under this RMPA would apply only to new leases. (See the glossary for definitions of stipulations versus COAs.)
- New information may lead to changes in delineated GRSG habitat. New habitat areas, or areas that are no longer habitat, may be identified. This adjustment would typically result in small changes to areas requiring the stipulations or management actions stated in this plan. Existing leases in these areas would not be subject to the new stipulations but could be subject to RDFs. Modifications to GRSG habitat would be updated in the data inventory through plan

maintenance. In areas that are no longer habitat, the waiver/exception/modification process would be used to remove stipulations or management actions that were no longer needed.

- If an area is leased, it could be developed; however, not all leases would be developed within the life of this RMPA.
- As the demand for energy increases, so will the demand for extracting energy resources in areas with potential.
- Technological advancements, such as directional drilling, could lead to changes in levels of fluid mineral development potential throughout the planning area, as additional resources become more easily accessible.
- Stipulations also apply to fluid mineral leasing on all surface lands with federal mineral estate. This includes federal mineral estate with BLM-administered surface lands and other surface lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- Oregon is considered a “pioneering” area for oil and gas resources. This means that development is not likely to occur in the planning area until the market for these resources changes. No wells have currently been developed in the planning area, and the current decline in oil and gas leases in Oregon is expected to continue in the near future.
- The 2008 Programmatic EIS for Geothermal Leasing in the Western United States estimated that Oregon could have 1,090 megawatts of geothermal development by 2025.
- Geothermal resource exploration and development in Oregon will continue to rise, particularly with the introduction of new technologies, such as engineered and enhanced geothermal systems.

4.12.2 Nature and Type of Effects

The following analysis describes the nature and type of impacts that could affect fluid minerals in the Oregon planning area. Details on how the occurrence of each impact would vary by alternative are described under the various subheadings.

Closing unleased areas within GRSG habitat to fluid mineral leasing would directly impact the fluid minerals program by removing the possibility of fluid mineral resources in that area to be accessed and extracted or used. Fluid mineral operations may move to nearby private lands if similar geologic conditions exist, thereby reducing the number of operations on federal mineral estate. Existing leases within areas closed to leasing would remain valid through

their term but could not be renewed, unless they were developed. Once these leases expire, the fluid minerals covered by them could not be developed.

Existing oil and gas leases in the Oregon planning area are likely to expire before being developed. However, oil and gas resources in the planning area are unlikely to be developed even in areas open to fluid mineral development. This is due to the lack of anticipated future demand for oil and gas resources in the planning area in the near future.

Unlike oil and gas trends, interest in geothermal resources in the decision area has increased in recent years. Geothermal exploration for commercial production is expected on lands within the planning area over the next 10 to 15 years. Therefore, existing geothermal leases are more likely to be developed within their lease terms than existing oil and gas leases. Additionally, closures or stipulations in unleased areas would have a greater impact on geothermal development than on oil and gas or other fluid mineral development. See **Section 3.12** for more information on fluid mineral trends in the planning area.

Management actions that prohibit or restrict surface occupancy or disturbance overlying federal fluid mineral resources would also directly impact the development of those resources by restricting the availability of mineral resources to be developed or extracted. Examples of these management actions are TLs, NSO and CSU stipulations, and limitations on the total amount of surface disturbance in areas (such as the 3 percent disturbance cap). Surface-disturbing activities could be shifted, additional protective measures would be required, and extraction delays could occur.

Applying the disturbance caps would directly impact fluid minerals by limiting the amount of disturbance from various activities, including fluid mineral development. If total disturbance in GRS habitat reached the disturbance cap, no additional disturbance from fluid mineral activities could occur. Because fluid mineral exploration and development involves surface disturbance, new exploration and development would essentially be shut down once the disturbance cap was reached.

In areas where NSO stipulations are applied, federal fluid minerals could be leased; however, the leaseholder/operator would have to use off-site methods, such as directional drilling, to access the mineral resource. The area where directional drilling could be effectively used is limited. This means that some minerals would be inaccessible in areas where an NSO stipulation covers a large area or where no leasing is allowed on surrounding lands. Because the Oregon planning area is a pioneering area, where precise locations of fluid mineral resources are unknown, wildcat wells are necessary to identify resource areas. Therefore, applying an NSO stipulation to GRS habitat in the planning area would effectively preclude development of fluid mineral resources in that habitat.

Applying CSU stipulations allows some use and occupancy of the surface. While less restrictive than an NSO stipulation, a CSU stipulation allows the BLM the following actions:

- To require special operational constraints
- To shift the surface-disturbing activity associated with fluid mineral leasing more than the standard 200 meters (656 feet)
- To require additional protective measures (e.g., restrictions on noise levels) to protect GRSG

For example, a CSU stipulation might apply limitations on noise levels during certain times of day. While not prohibiting surface-disturbing activities, a CSU stipulation can influence the location and level of operations within the subject area.

TL stipulations may be necessary to protect GRSG from impacts of development. These stipulations are necessary if impacts cannot be mitigated within the standard 60-day suspension of operation period afforded by regulation. Areas where TL stipulations are applied would be temporarily closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames based on seasons or GRSG breeding times. Some operations would be allowed at all times (e.g., vehicle travel and maintenance); however, construction, drilling, completions, and other operations considered to be intensive would not be allowed during the restricted time frame. Most activities, however, could be initiated and completed outside of the restricted dates specified in the TL stipulation.

Applying COAs to existing leases would directly impact fluid mineral operations. This includes RDFs and conservation measures outlined in **Chapter 2**. These RDFs and conservation measures also include such standards as noise restrictions, height limitations on structures, design requirements, water development standards, and remote monitoring requirements. Additional site-specific planning (i.e., master development plans and unitization) may also be included.

Applying all of these requirements through COAs would impact fluid mineral operations by restricting the development or extraction of mineral resources. To avoid these restrictions, operators may relocate to nearby state or private lands (where resources, geology, and topography permit), thereby decreasing the number of oil, gas, and geothermal operations on federal mineral estate.

Placing limits on geophysical exploration would reduce the availability of data on fluid mineral resources on federal mineral estate. Because there is little existing data on fluid mineral resources in the decision area, the development potential for oil, gas, and geothermal resources in areas where geophysical exploration

was limited could remain unknown. Timing limitations on geophysical exploration could also lead to extraction and utilization delays.

Buying out or cancelling leases in GRSG habitat would prevent future development of existing fluid mineral leases. However, in accordance with 43 CFR, Part 3108.3, leases may only be cancelled by the Secretary of the Interior when (1) the lessee has a nonproducing well and fails to comply with the provisions of the law, regulations, or lease; or (2) the lease was improperly issued. Cancellation of a lease with a producing well requires a judicial proceeding.

Management actions creating ROW exclusion or avoidance areas would indirectly impact fluid mineral extraction by limiting the available means for transporting fluid minerals to processing facilities and markets, for oil and gas, or for transmitting produced geothermal-sourced electricity to the power grid. For example, new natural gas pipelines could not be built in a ROW exclusion area. Oil, gas, and geothermal operations may be moved to nearby private lands where transport and transmission is easier, thereby reducing the number of operations on federal mineral estate. Because ROW avoidance areas would allow for limited ROW development, impacts of avoidance areas would be less severe than those of ROW exclusion areas. Impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs to satisfy valid existing rights. Existing leases in areas managed as ROW avoidance or exclusion would also be impacted, as described above.

Closing areas to mineral material disposal would indirectly impact fluid minerals in the areas by reducing the amount of readily available material for road and pipeline construction. This would limit the available means for accessing fluid mineral resources and transporting those resources to processing facilities and markets.

Implementing management for the following resources to protect GRSG would have negligible or no impact on mineral resources under all alternatives; therefore, they not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Travel management
- Locatable minerals
- Nonenergy leasable minerals
- Special designations
- Special status plants

4.12.3 Impacts Common to All Alternatives

Impacts from Leasable Minerals Management

Under all alternatives, reclamation bonds would be required, pursuant to 43 CFR, Part 3104. The amount of the bond would need to be sufficient to ensure full restoration of lands to the condition in which they were found. In addition, applications for permits to drill, including drilling plans and surface use plans of operations, would be required under all alternatives, in accordance with 43 CFR, Part 3162.

4.12.4 Alternative A

Impacts from Lands and Realty Management

Under Alternative A, 857,600 acres (7 percent of BLM-administered surface in the decision area) would continue to be managed as ROW exclusion areas. Another 3,445,700 acres (27 percent of BLM-administered surface in the decision area) would continue to be managed as ROW avoidance areas. This management would continue to impact the fluid minerals program as described under **Section 4.12.2, *Nature and Type of Effects***.

Impacts from Leasable Minerals Management

Under Alternative A, fluid mineral resources in the planning area would continue to be managed according to any closures, stipulations, or BMPs in the governing RMPs.

Table 4-39, Fluid Mineral Leasing Categories in the Decision Area, Alternative A, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Table 4-39
Fluid Mineral Leasing Categories in the Decision Area,
Alternative A

Leasing Category	Acres
Closed to Leasing	3,497,100
Leased	0
Unleased	3,497,100
Open Subject to NSO Stipulations	860,000
Leased	10,600
Unleased	849,400
Open Subject to CSU/TL Stipulations	4,281,900
Leased	128,600
Unleased	4,153,300
Open Subject to Standard Terms and Conditions	5,509,100
Leased	81,000
Unleased	5,428,100

Source: Oregon/Washington BLM 2015.

Under Alternative A, 3,497,100 acres (25 percent) of federal mineral estate within the decision area would remain closed to fluid mineral leasing. All of these acres are unleased. Impacts of closing these areas would be the same type as those described under **Section 4.12.2**. Actions applicable to unleased acres have a greater impact on the fluid minerals program than actions applicable to leased acres because existing leases would not be subject to new stipulations or closures unless the leases expired and were reissued. An additional 860,000 acres (6 percent) of federal mineral estate in the decision area would remain subject to NSO stipulations. Of the acres subject to NSO stipulations, 849,400 acres (99 percent) are unleased.

Geophysical exploration would continue to be allowed throughout the planning area under Alternative A. Existing leases would continue to be subject to any stipulations or COAs that applied at the time the lease was issued.

Impacts from Mineral Materials (Salables) Management

Approximately 10,536,500 acres (74 percent) of federal mineral estate within the decision area would remain open to mineral material disposal under Alternative A. Approximately 3,611,700 acres (26 percent) of federal mineral estate within the decision area would remain closed to mineral material disposal. Closing these areas to mineral material disposal would indirectly impact fluid minerals as described under **Section 4.12.2**.

4.12.5 Alternative B

Impacts from Lands and Realty Management

Under Alternative B, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all PHMA would be closed to fluid mineral leasing under Alternative B, managing PHMA as ROW exclusion areas would have no impact on fluid minerals.

All BLM-administered surface in GHMA not already managed as ROW exclusion (totaling 5,662,600 acres, or 45 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance under Alternative B. Fluid minerals beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.12.2**. Overall, more acres would be managed as ROW avoidance under Alternative B than under Alternative A; therefore, impacts on the fluid minerals program from these ROW avoidance areas would increase under Alternative B.

Impacts from Leasable Minerals Management

Under Alternative B, 7,317,500 acres (52 percent of the federal mineral estate decision area), including all federal mineral estate within PHMA would be closed to fluid mineral leasing. All acres closed would be unleased; therefore this management would close 52 percent of the 14,147,900 unleased acres in the decision area. Closure of these acres would directly impact the fluid minerals

program in the manner described under **Section 4.12.2**. Because twice as many unleased acres in the federal mineral estate decision area would be closed under Alternative B as under Alternative A, impacts would increase compared with Alternative A.

The 6,127,800 acres of federal mineral estate within GHMA (43 percent of the federal mineral estate decision area), as well as all federal mineral estate outside GRSG habitat in the planning area, would be subject to the same stipulations and management as those under Alternative A.

Table 4-40, Fluid Mineral Leasing Categories in the Decision Area, Alternatives B and E, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Table 4-40
Fluid Mineral Leasing Categories in the Decision Area,
Alternatives B and E

Leasing Category	Acres
Closed to Leasing	7,217,500
Leased	0
Unleased	7,217,500
Open Subject to NSO Stipulations	586,800
Leased	20
Unleased	586,800
Open Subject to CSU/TL Stipulations	2,498,300
Leased	100
Unleased	2,498,200
Open Subject to Standard Terms and Conditions	3,845,500
Leased	100
Unleased	3,845,400

Source: Oregon/Washington BLM 2013.

A disturbance cap would apply to all human activity in GRSG habitat, including fluid mineral activities. If the cap were reached, it would impact fluid minerals as described under *Nature and Type of Effects*, representing an increase in impacts on fluid minerals compared with Alternative A.

Geophysical exploration would be allowed on the 5,106,900 acres of federal mineral estate within PHMA but would be subject to TLs and other restrictions. Most notably, geophysical exploration within PHMA would be allowed only for gathering information about fluid mineral resources outside PHMA. Because of these limitations and the fact that PHMA would be closed to fluid mineral leasing, geophysical exploration in PHMA would decrease under this alternative. Decreases in geophysical exploration in PHMA would impact the fluid minerals program as described under **Section 4.12.2**.

Under Alternative B, conservation measures in addition to RDFs would be applied as COAs to the 5 existing federal leases in PHMA. These RDFs and conservation measures would include requirements such as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

Impacts from Mineral Materials (Salables) Management

Under Alternative B, approximately 7,311,600 acres of federal mineral estate (52 percent of the federal mineral estate decision area), including all acres in PHMA would be closed to mineral material disposal. However, because all PHMA would be closed to fluid mineral leasing under this alternative, closing PHMA to mineral material disposal would not impact fluid minerals.

4.12.6 Alternative C

Impacts from Lands and Realty Management

Under Alternative C, 10,682,100 acres (85 percent of BLM-administered surface in the decision area), including all occupied habitat would be managed as ROW exclusion areas. However, because all occupied habitat would be closed to fluid mineral leasing under Alternative C, managing occupied habitat as ROW exclusion would have no impact on fluid minerals.

Impacts from Leasable Minerals Management

Under Alternative C, 11,699,400 acres (83 percent of the federal mineral estate decision area), including all federal mineral estate within occupied habitat would be closed to fluid mineral leasing. This closure would include 11,658,000 acres (82 percent) of unleased federal mineral estate in the decision area. Closing these acres would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. Because three times as many unleased acres in the federal mineral estate decision area would be closed under Alternative C as under Alternative A, impacts would increase compared with Alternative A.

Table 4-41, Fluid Mineral Leasing Categories in the Decision Area, Alternatives C and F, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Under Alternative C, geophysical exploration would be prohibited on the 11,234,800 acres of federal mineral estate within occupied habitat. This prohibition would impact fluid minerals, as described under **Section 4.12.2**. Because geophysical exploration would be unrestricted under Alternative A, impacts would increase under Alternative C.

Table 4-41
Fluid Mineral Leasing Categories in the Decision Area,
Alternatives C and F

Leasing Category	Acres
Closed to Leasing	11,699,400
Leased	41,400
Unleased	11,658,000
Open Subject to NSO Stipulations	187,800
Leased	10,500
Unleased	177,400
Open Subject to CSU/TL Stipulations	791,000
Leased	94,000
Unleased	697,000
Open Subject to Standard Terms and Conditions	1,469,900
Leased	74,400
Unleased	1,395,500

Source: Oregon/Washington BLM 2013.

The 43 existing oil and gas leases in GRSG habitat would be subject to TLs with the types of impacts described under **Section 4.12.2**. Because these timing limitations would be more restrictive than the existing limitations applied under Alternative A, impacts would increase under Alternative C. In addition, these existing leases could be amended, canceled, bought out, or required to be relinquished. Impacts of these changes to existing leases would be the same type as those described under **Section 4.12.2**.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, approximately 11,753,400 acres of federal mineral estate (83 percent of federal mineral estate in the decision area, including all occupied habitat) would be closed to mineral material disposal. However, because all occupied habitat would be closed to fluid mineral leasing under Alternative C, closing occupied habitat to mineral material disposal would not impact fluid minerals.

4.12.7 Alternative D

Impacts from Lands and Realty Management

Like Alternative A, under Alternative D 857,600 acres (7 percent) of BLM-administered surface in the decision area would be managed as ROW exclusion areas. A total of 5,964,800 acres (47 percent), including all PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. Where these exclusion or avoidance areas overlapped with areas open to fluid mineral leasing, impacts on the fluid minerals program would occur, as described under **Section 4.12.2**. Because 73 percent more acres would be managed as ROW avoidance under Alternative D compared with Alternative A, the magnitude of impacts would increase.

Impacts from Leasable Minerals Management

Under Alternative D, the BLM would apply a buffer system to manage fluid mineral development in GRSG habitat. Under this system, leks would be surrounded by buffers of varying sizes in which NSO stipulations would apply. In addition, CSU and TL stipulations would apply to all areas within occupied habitat that are outside a lek buffer. The CSU stipulations would include noise and tall structure limitations, a site-specific plan of development to limit habitat fragmentation and, in PHMA, a disturbance limit and 640-acre spacing requirements. The stipulations that would apply can be summarized as follows:

- Within PHMA, apply a 4-mile NSO buffer from active leks.
- Within PHMA, beyond 4 miles of active leks, apply CSU/TL stipulations.
- Within GHMA, apply a 1-mile NSO buffer from active leks.
- Within GHMA, beyond 1 mile of active leks, apply CSU/TL stipulations.
- Where the 4-mile lek buffer extends outside PHMA to GHMA, apply NSO stipulations for 1 mile and CSU stipulations beyond.

Application of these surface-disturbance restrictions, TLs, and other operating standards would limit the siting, design, and operations of fluid mineral development projects. This would impact the fluid minerals program in the manner described under **Section 4.12.2**. Because these restrictions and standards would be applied throughout occupied habitat under Alternative D, the magnitude of the impacts would increase, compared with Alternative A.

Table 4-42, Fluid Mineral Leasing Categories in the Decision Area, Alternative D, breaks down the acres within the decision area by whether they would be open or closed to leasing and what stipulations would be applied.

Acres closed under Alternative D would be the same as under Alternative A. However, 3,819,800 acres, or 27 percent of the federal mineral estate decision area would be subject to NSO stipulations. These stipulations would cover 3,808,200 acres (27 percent) of unleased federal mineral estate in the decision area. Applying NSO stipulations to these areas would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. Because four times more unleased acres would be subject to NSO stipulations under Alternative D than under Alternative A, the magnitude of the impacts would increase under Alternative D.

Table 4-42
Fluid Mineral Leasing Categories in the Decision Area,
Alternative D

Leasing Category	Acres
Closed to Leasing	3,497,100
Leased	0
Unleased	3,497,100
Open Subject to NSO Stipulations	3,819,800
Leased	11,600
Unleased	3,808,200
Open Subject to CSU/TL Stipulations	5,361,400
Leased	134,200
Unleased	5,227,100
Open Subject to Standard Terms and Conditions	1,469,900
Leased	74,400
Unleased	1,395,500

Source: Oregon/Washington BLM 2013.

Like under Alternative B, a 3 percent disturbance cap would apply to all human activity in GRSG habitat with the same impacts on fluid minerals.

Geophysical exploration would be allowed on the 11,234,800 acres of federal mineral estate within PHMA and GHMA, but it would be subject to TLs. The impact of these TLs would be the same type as that described under **Section 4.11.2**. Because no TLs would be applied to geophysical exploration under Alternative A, impacts of these limitations would increase under Alternative D.

In addition to RDFs, conservation measures would be applied as COAs to 5 existing leases overlying federal mineral estate in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards. The types of impacts from these COAs would be the same as those described under **Section 4.12.2**, although the impacts would occur only if operators were to develop these leases.

In addition to the requirements described above, the COAs would require or encourage unitization when necessary to minimize harm to GRSG. They also would call for completion of master plans for developing fluid mineral resources instead of processing individual applications for permit to drill. Requiring these plans would result in the impacts described under **Section 4.12.2**.

The BLM could not apply COAs that would eliminate reasonable opportunities to develop the lease. Therefore, although restrictions on development would increase where COAs were applied, fluid mineral development would still be allowed.

Impacts from Mineral Materials (Salable Minerals) Management

Like Alternative B, under Alternative D, the BLM would close all PHMA to mineral materials disposal. Fluid mineral development on the 720,500 acres within PHMA that would not be closed or subject to NSO stipulations (i.e., areas beyond 4 miles from leks) would be impacted as described under **Section 4.12.2**. Because more areas within PHMA where fluid mineral development might occur would be closed to mineral material disposal under Alternative D than under Alternative A, impacts on fluid minerals from closing these areas to mineral material disposal would increase under Alternative D.

4.12.8 Alternative E***Impacts from Lands and Realty Management***

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all Core Area habitat would be closed to fluid mineral leasing under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on fluid minerals.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on fluid minerals.

Impacts from Leasable Minerals Management

Similar to Alternative B, under Alternative E, all Core Area habitat would be closed to fluid mineral leasing. Impacts would be the same as those under Alternative B.

Fluid mineral management of all federal mineral estate in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts. Management of geophysical exploration under Alternative E would also be the same as that under Alternative A, with the same impacts.

Impacts of fluid mineral management on existing fluid mineral leases in the planning area under Alternative E would be the same as those under Alternative A.

Impacts from Mineral Materials (Salables) Management

Like Alternative B, under Alternative E, all Core Area habitat would be closed to mineral material disposal. However, because all Core Area habitat would be closed to fluid mineral leasing under Alternative E, closing Core Area habitat to mineral material disposal would not impact fluid minerals.

4.12.9 Alternative F

Impacts from Lands and Realty Management

Management of ROW avoidance and exclusion areas would be the same as that under Alternative C. Like Alternative C, all occupied habitat would be closed to fluid mineral leasing under Alternative F. Therefore, ROW management would have no impacts on fluid minerals.

Impacts from Leasable Minerals Management

Like Alternative C, all occupied habitat would be closed to fluid mineral leasing under Alternative F. Impacts of this closure would be the same as those under Alternative C.

A 3 percent disturbance cap would apply to fire disturbance as well as all human activity in GRSG habitat, including fluid mineral activities. If the cap were reached, it would impact fluid minerals as described under *Nature and Type of Effects*, representing an increase in impacts on fluid minerals compared with Alternative A. Because fire would be included in the disturbance cap under Alternative F, the 3 percent cap is more likely to be reached, and fluid minerals are more likely to be impacted.

Geophysical exploration would be allowed on the 10,489,400 acres of federal mineral estate within occupied habitat but would be subject to TLs and other restrictions. Most notably, geophysical exploration within occupied habitat would be allowed only for gathering information about fluid mineral resources outside occupied habitat. Because of these limitations and the fact that occupied habitat would be closed to fluid mineral leasing, geophysical exploration in occupied habitat would decrease under this alternative. Decreases in geophysical exploration in occupied habitat would impact the fluid minerals program, as described under **Section 4.12.2**.

Under Alternative F, the 5 existing leases in PHMA would be subject to management similar to that under Alternative B. However, under Alternative F, TLs would prohibit human presence and surface-disturbing activities during the nesting and brood-rearing season. This management would be the most restrictive of all the alternatives.

Impacts from Mineral Materials (Salable Minerals) Management

Like Alternative B, under Alternative F, all PHMA would be closed to mineral material disposal. However, because all PHMA would be closed to fluid mineral leasing under Alternative E, closing PHMA to mineral material disposal would not impact fluid minerals.

4.12.10 Proposed Plan

Impacts from Lands and Realty Management

Under the Proposed Plan, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance areas for fluid mineral-related activities. However, because all PHMA would be subject to NSO stipulations on fluid mineral leases, no fluid mineral activities on future leases within these areas would require new ROWs. Therefore, managing PHMA as ROW avoidance areas would have no impact on fluid minerals.

All BLM-administered surface in GHMA (totaling 5,662,600 acres, or 45 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance for high voltage transmission lines and major pipelines but open to other fluid mineral-related ROW location under the Proposed Plan. Fluid minerals beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.12.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the fluid minerals program from these ROW avoidance areas would increase under the Proposed Plan.

Impacts from Leasable Minerals Management

Under the Proposed Plan, 4,333,700 acres (31 percent of the federal mineral estate decision area), including all federal mineral estate in PHMA, would be subject to NSO stipulations; 4,319,800 acres subject to NSO stipulations would be unleased, so this management would apply NSO stipulations to 31 percent of the 14,147,900 unleased acres in the decision area. Application of NSO stipulations to leases on these acres would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. The lack of waivers and modifications combined with the limited exceptions for NSO stipulations under the Proposed Plan would further restrict oil and gas activities. Impacts would increase on the 1,205,900 acres in the SFA that would be subject to NSO stipulations with no waivers, exceptions, or modifications. Because five times as many unleased acres in the federal mineral estate decision area would be subject to NSO stipulations under the Proposed Plan as under Alternative A, impacts would increase, compared with Alternative A.

Approximately 4,847,400 acres of federal mineral estate would be subject to CSU and TL stipulations. This includes all federal mineral estate in GHMA not subject to other existing stipulations, or 34 percent of the federal mineral estate decision area; 4,715,500 of these acres (33 percent of the unleased acres in the federal mineral estate decision area) would be unleased. Application of CSU and TL stipulations to leases on these acres would directly impact the fluid minerals program in the manner described under **Section 4.12.2**. Because 14 percent more unleased acres in the federal mineral estate decision area would be

subject to CSU and TL stipulations under the Proposed Plan as under Alternative A, impacts would increase compared with Alternative A.

Table 4-43 breaks down the acres in the decision area into the categories of open or closed to leasing and what stipulations would be applied.

Table 4-43
Fluid Mineral Leasing Categories in the Decision Area,
Proposed Plan

Leasing Category	Acres
Closed to leasing	3,497,100
Leased	0
Unleased	3,497,100
Open subject to NSO stipulations	4,333,700
Leased	14,000
Unleased	4,319,800
Open subject to CSU/TL stipulations	4,847,400
Leased	131,800
Unleased	4,715,500
Open subject to standard terms and conditions	1,469,900
Leased	74,400
Unleased	1,395,500

Source: Oregon/Washington BLM 2013

Under the Proposed Plan, the BLM would apply the same RDFs to the same acreage as under Alternative B. However, the only conservation measures applied would relate to master development plans and unitization. Impacts of these restrictions would be the same type as those described under **Section 4.12.2**.

Application of the 3 percent disturbance cap in PHMA and lek buffers in GHMA could impact both new and existing fluid mineral activities by preventing or restricting new surface development. New fluid mineral activities could be precluded if the cap were exceeded in an Oregon PAC (also known as BSU) and the proposed project area. New surface development on existing leases could be restricted if the cap were exceeded. However, the BLM would not apply the disturbance cap in a manner that would eliminate reasonable opportunities to develop an existing lease. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to fluid mineral development.

Geophysical exploration would be allowed on the 11,234,800 acres of federal mineral estate within GRSG habitat but would be subject to seasonal restrictions. Because of these limitations, geophysical exploration in GRSG habitat would decrease under this alternative. Decreases in geophysical

exploration in GRSG habitat would impact the fluid minerals program, as described under **Section 4.12.2**.

Under the Proposed Plan, conservation measures in addition to RDFs would be applied as COAs to the five federal leases in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

Impacts from Mineral Materials (Salables) Management

Under the Proposed Plan, approximately 7,343,300 acres of federal mineral estate, including all federal mineral estate in PHMA (52 percent of the federal mineral estate decision area) would be closed to mineral material disposal (with exceptions for free use permits and expansions of existing pits). However, because all PHMA would be subject to NSO stipulations on fluid mineral leases, no fluid mineral activities on future leases within these areas would require materials for construction of new surface facilities. Therefore, managing PHMA as ROW avoidance areas would have no impact on fluid minerals.

4.13 LOCATABLE MINERALS

4.13.1 Methods and Assumptions

Analysis of impacts on locatable minerals from this RMPA focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on locatable minerals would result from withdrawing an area from locatable mineral entry. Additional actions or conditions that would cause direct or indirect impacts on locatable minerals are described below.

Indicators

Indicators of impacts on locatable minerals are as follows:

- The amount of land withdrawn from locatable mineral entry
- The amount of land petitioned for withdrawal from locatable mineral entry
- The amount of land under claim and subject to buyout or validity exam
- Application of restrictions, such as required design features (RDFs) and conservation measures, that can be placed on locatable mineral development to prevent unnecessary or undue degradation of GRSG habitat, as the law allows

Assumptions

The analysis includes the following assumptions:

- New information may lead to changes in delineated GRSG habitat. New habitat areas, or areas that are no longer habitat, may be identified. This adjustment would typically result in small changes to areas requiring the stipulations or management actions stated in this plan. Specifically for locatable minerals, this would mean new habitat areas could be proposed for withdrawal through the withdrawal procedures, and areas that are no longer habitat could go through the withdrawal termination process. Modifications to GRSG habitat would be updated in the data inventory through plan maintenance. In areas that are no longer habitat, the recommended BMPs to protect GRSG would no longer apply.
- Management actions to withdraw areas from locatable mineral entry may also apply to locatable mineral activity on lands overlying federal mineral estate. This includes federal mineral estate underlying BLM-administered lands and lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- This analysis assumes that areas recommended for withdrawal would be withdrawn through a Public Land Order issued by the Secretary of the Interior or by Act of Congress.
- Increasing precious metals values are expected to increase interest in location, exploration, and development of locatable minerals claims in the planning area.

4.13.2 Nature and Type of Effects

Withdrawing an area to mining development removes the possibility of mineral resources not under a valid claim in that area from being accessed and extracted. This represents an impact on the potential discovery, development, and use of those resources by decreasing the availability of mineral resources on federal mineral estate.

Within areas withdrawn from locatable mineral entry, BLM will not approve a plan of operations or allow notice-level operations to proceed until a mineral examination report has been completed to determine whether the mining claim was valid before the withdrawal. If claims were found to be invalid, they could not be developed. These exams would also delay mineral extraction. Finally, developers may choose to relocate outside the decision area, where there are similar geology and available resources, including outside the continental United States, where there are fewer requirements.

A validity exam determines whether a valid existing right exists, which must be recognized even in a withdrawn area. In order to have a valid existing right, a claim holder must demonstrate that, as of the date of the withdrawal and at the date of the determination, the claim contained a discovery of a valuable mineral deposit and that the claim was used and occupied properly under the Mining Law of 1872, as amended.

Existing notices or plans of operations would also have to undergo a validity exam before acceptance (for notice) or approval (for plan of operations) of any material change to the operation.

Management actions creating ROW exclusion or avoidance areas would indirectly impact locatable mineral extraction by possibly limiting the available means and requiring additional mitigation actions for accessing mineral resources and transporting locatable minerals to processing facilities and markets.

Designating areas as special management areas, such as ACECs, would trigger requirement of a plan of operation (including NEPA analysis) for any surface-disturbing activities in those areas greater than casual use, regardless of the acreage involved, in accordance with 43 CFR, 3809. The requirement for plans of operations within a special management area would result in longer delays than would be expected if the operation were permitted under a mining notice. Additionally, mitigation measures could be required through the plans of operations, which would further restrict locatable mineral development activities. This would be true even when the Plan of Operation surface disturbance proposed is on fewer than 5 acres.

Implementing management for the following resources to protect GRSB would have negligible or no impact on locatable minerals under all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Air quality and climate change
- Special status plants

4.13.3 Impacts Common to All Alternatives

Impacts from Locatable Minerals Management

Under all alternatives, approximately 996,800 acres (7 percent) of the total federal mineral estate for locatable minerals would remain withdrawn from locating mining claims; new exploration and mining would be precluded. **Table 4-44, Quantitative Impacts on Locatable Minerals**, illustrates the change in acres open to locatable mineral entry and to be petitioned for withdrawal from locatable mineral entry across the alternatives.

The management actions being considered in this RMPA could affect both existing and future mining claims. Developers would continue to submit a notice to the BLM for exploration and development on mining claims with a cumulative surface disturbance of 5 or fewer acres. Additionally, they would continue to submit a plan of operations for exploration and development for areas of greater than 5 acres, commercial development, or for any development (regardless of size) within special management areas, as outlined in 43 CFR, Part 3809.

4.13.4 Alternative A

Impacts from Lands and Realty Management

Under Alternative A, 857,600 acres (7 percent of BLM-administered surface in the decision area) would continue to be managed as ROW exclusion areas. Another 3,445,700 acres (27 percent of BLM-administered surface in the decision area) would continue to be managed as ROW avoidance areas. This management would continue to impact the locatable minerals program as described under **Section 4.13.2, Nature and Type of Effects**.

Impacts from Locatable Minerals Management

Under Alternative A, 24,400 acres (less than one percent) of federal mineral estate in the decision area would continue to be petitioned for withdrawal from locatable mineral entry. This would be in addition to the 1,435,900 acres currently withdrawn (see **Section 4.13.3, Impacts Common to All Alternatives**). If the Secretary of the Interior were to issue a Public Land Order to formally withdraw these lands, subject to valid existing rights, new mining claims would be forbidden, under the Mining Law of 1872. Mining would be allowed on existing, valid mining claims. Impacts on existing and future mining claims are similar to those described under **Section 4.13.2, Nature and Type of Effects**.

There are 547 locatable mining claims in occupied habitat, 13 plans of operations, and 49 notices in occupied habitat. One plan of operation is in an area petitioned for withdrawal.

No additional BMPs to protect GRSG are identified under Alternative A.

Table 4-44
Quantitative Impacts on Locatable Minerals

Locatable Minerals	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Total federal mineral estate for locatable minerals	14,720,100	14,720,100	14,720,100	14,720,100	14,720,100	14,720,100	14,720,100
Total acreage withdrawn from locatable mineral entry	1,435,900	1,435,900	1,435,900	1,435,900	1,435,900	1,435,900	1,435,900
Total acreage petitioned for withdrawal from locatable mineral entry	24,400	4,612,200	9,987,900	24,400	4,612,200	4,612,200	1,835,800
<i>Increase from Alternative A</i>	N/A	4,587,800	9,963,500	0	4,587,800	4,587,800	1,815,300
Total acreage open to locatable mineral exploration or development	12,687,900	8,124,600	2,724,500	12,687,900	8,124,600	8,124,600	10,876,600

Source: Oregon/Washington BLM 2013

Impacts from Special Designations Management

Under Alternative A, 715,049 acres of BLM-administered surface within the decision area would continue to be designated ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**.

4.13.5 Alternative B***Impacts from Lands and Realty Management***

Under Alternative B, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all PHMA would be recommended for withdrawal from locatable mineral entry under Alternative B, managing PHMA as ROW exclusion areas would have no impact on locatable minerals.

Impacts from Locatable Minerals Management

Under Alternative B, 4,612,200 acres of federal mineral estate in the decision area (including all PHMA) would be recommended for withdrawal from locatable mineral entry under the Mining Law of 1872. Combined with the additional 1,435,900 acres previously withdrawn (see **Section 4.13.3**), the availability of locatable minerals would be limited on 6,048,100 acres. This represents 43 percent of the federal mineral estate decision area, or four times the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.13.2**.

Under this alternative, 276 claims, 5 plans of operations, and 27 notices would be within PHMA. As such, all would be within the area to be petitioned for withdrawal. This represents 45 percent of the 609 claims, plans, and notices within occupied habitat. The types of impacts on these claims, plans of operations, and notices would be the same as those described under **Section 4.13.2**. Because the number of claims, plans, and notices within areas recommended for withdrawal would increase, impacts of validity exam requirements would increase under Alternative B.

Operators' ability to access and extract locatable minerals on federal mineral estate would not be impacted by applying RDFs (to the extent consistent w/ applicable law) listed in **Appendix C**. However, mining operations and practices could be affected if an operator were to agree to apply any of the RDFs on a project-specific basis. Mitigation measures and other mandatory restrictions subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, could be applied through a separate NEPA process for a specific plan of operations.

Impacts from Special Designations Management

Like Alternative A, under Alternative B, 715,049 acres of BLM-administered surface within the decision area would be designated ACECs. A plan of

operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all PHMA were withdrawn as recommended under Alternative B, no new locatable mineral operations would be allowed in these areas; therefore, ACEC designation in PHMA would not impact locatable minerals.

4.13.6 Alternative C

Impacts from Lands and Realty Management

Under Alternative C, 10,682,100 acres (85 percent of BLM-administered surface in the decision area), including all occupied habitat would be managed as ROW exclusion areas. However, because all occupied habitat would be recommended for withdrawal from locatable mineral entry under Alternative C, managing occupied habitat as ROW exclusion would have no impact on locatable minerals.

Impacts from Locatable Minerals Management

Under Alternative C, areas within GRSG habitat would be petitioned for withdrawal in a manner similar to that under Alternative B; however, a larger number of acres would be petitioned for withdrawal under Alternative C. Under this Alternative, 9,987,900 acres would be petitioned for withdrawal. Combined with the additional 1,435,900 acres previously withdrawn (see **Section 4.13.3**), the availability of locatable minerals would be limited on 11,423,800 acres. This represents 81 percent of the federal mineral estate decision area, or eight times the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.13.2**.

Under this alternative, all of the 547 claims, 13 plans of operations, and 49 notices within occupied habitat would be within the area to be petitioned for withdrawal. The types of impacts on these claims, plans of operations, and notices would be the same as those described under **Section 4.13.2**. Because the number of claims, plans, and notices within areas recommended for withdrawal would increase, impacts of validity exam requirements would increase under Alternative C.

Impacts from Special Designations Management

Under Alternative C, 4,348,399 acres of BLM-administered surface within the decision area (all within PHMA) would be designated as new ACECs, in addition to the 200,399 acres of PHMA in existing ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all occupied habitat were withdrawn as recommended under Alternative C, new locatable mineral operations would only be allowed on valid existing mining claims after a determination is made by BLM; therefore, ACEC designation in PHMA would not impact locatable minerals.

4.13.7 Alternative D

Impacts from Lands and Realty Management

Like Alternative A, under Alternative D 857,600 acres (7 percent) of BLM-administered surface in the decision area would be managed as ROW exclusion areas. A total of 5,964,800 acres (47 percent), including all PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. Where these exclusion or avoidance areas overlapped with areas open to locatable mineral entry, impacts on the locatable minerals program would occur, as described under **Section 4.13.2**. Because 73 percent more acres would be managed as ROW avoidance under Alternative D compared with Alternative A, the magnitude of impacts would increase.

Impacts from Locatable Minerals Management

Locatable mineral management under Alternative D would be similar to that under Alternative A. The exception is that the new and existing claims, operations, and notices in PHMA would be requested to change mining operations and practices to limit surface disturbance to 3 percent of PHMA and to mitigate impacts on GRSG. Because these actions would not be mandatory, operators' ability to access and extract locatable minerals on federal mineral estate would not be impacted. Mitigation measures and other mandatory restrictions could be applied through a separate NEPA process for a specific plan of operations.

Impacts from Special Designations Management

Special designation management under Alternative D would be the same as that under Alternative A, with the same impacts.

4.13.8 Alternative E

Impacts from Lands and Realty Management

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all Core Area habitat would be petitioned for withdrawal from locatable mineral entry under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on locatable minerals.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on locatable minerals.

Impacts from Locatable Minerals Management

Similar to Alternative B, 4,612,200 acres of federal mineral estate in the decision area (including all Core Area habitat) would be petitioned for withdrawal from locatable mineral entry under Alternative E. This petitioning for withdrawal

would impact locatable minerals, as described under Alternative B and under **Section 4.13.2**.

No additional BMPs to protect GRSG are identified under this alternative.

Impacts from Special Designations Management

Like Alternative A, under Alternative D, 715,049 acres of BLM-administered surface within the decision area would be designated ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all Core Area habitat were withdrawn as recommended under Alternative B, no new locatable mineral operations would be allowed in these areas; therefore, ACEC designation in Core Area habitat would not impact locatable minerals.

4.13.9 Alternative F

Impacts from Lands and Realty Management

Like Alternative C, under Alternative F, all occupied habitat would be managed as ROW exclusion areas. However, under Alternative F, PHMA would be recommended for withdrawal from locatable mineral entry; therefore, management of PHMA as ROW exclusion areas would have no impact on locatable minerals.

Locatable mineral operations outside PHMA would be impacted as described under **Section 4.13.2**. Because more areas would be managed as ROW exclusion areas under Alternative F, impacts would increase compared with Alternative A.

Impacts from Locatable Minerals Management

Locatable mineral management under Alternative F would be the same as that under Alternative B, with the same impacts.

Impacts from Special Designations Management

Under Alternative C, 4,040,200 acres of BLM-administered surface within the decision area would be designated ACECs in addition to the existing ACECs. A plan of operation would be required for locatable mineral operations within these ACECs, with the type of impacts described under **Section 4.13.2**. However, if all PHMA were withdrawn as recommended under Alternative F, no new locatable mineral operations would be allowed in these areas.

4.13.10 Proposed Plan

Impacts from Lands and Realty Management

Under the Proposed Plan, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance areas. Where these avoidance areas overlapped with areas open to locatable mineral entry, impacts

on the locatable minerals program would occur, as described under **Section 4.13.2**.

All BLM-administered surface in GHMA (totaling 5,662,600 acres, or 45 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance for high voltage transmission lines and major pipelines but open to minor ROWs under the Proposed Plan. Impacts on the locatable minerals program could be impacted by the ROW avoidance area, as described under **Section 4.13.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the locatable minerals program from these ROW avoidance areas could increase under the Proposed Plan.

Impacts from Locatable Minerals Management

Under the Proposed Plan, 1,835,800 acres of federal mineral estate in the decision area, specifically land designated as SFA, would be recommended for withdrawal from locatable mineral entry under the Mining Law of 1872. Combined with the additional 1,435,900 acres previously withdrawn (see **Section 4.13.3**), the availability of locatable minerals would be limited on 3,271,700 acres. This represents 23 percent of the federal mineral estate decision area, or twice the acreage under Alternative A. The types of impacts would be the same as those described under **Section 4.13.2**.

Under this alternative, 117 claims, 1 plan of operation, and 9 notices would be in the SFA. As such, all would be in the area to be recommended for withdrawal. This represents 21 percent of the 609 claims, plans, and notices in occupied GRSG habitat. The types of impacts on these claims, plans of operation, and notices would be the same as those described under **Section 4.13.2**.

Operators' ability to access and extract locatable minerals on federal mineral estate would not be impacted by applying RDFs (to the extent consistent w/ applicable law) listed in **Appendix C**. However, mining operations and practices could be affected if an operator were to agree to apply any of the RDFs on a project-specific basis. Mitigation measures and other mandatory restrictions could be applied through a separate NEPA process for a specific plan of operations.

Impacts from Special Designations Management

Like Alternative A, under the Proposed Plan, 715,049 acres of BLM-administered surface in the decision area would be designated as ACECs. A plan of operation would be required for locatable mineral operations in these ACECs, with the type of impacts described under **Section 4.13.2**.

4.14 MINERAL MATERIALS (SALABLE MINERALS)

4.14.1 Methods and Assumptions

Indicators

Indicators of impacts on mineral resources are as follows:

- The amount of land closed to (salable) mineral material disposal
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas

Assumptions

The analysis includes the following assumptions:

- New information may lead to changes in delineated GRSG habitat. New habitat areas or areas that are no longer habitat may be identified. This adjustment would typically result in small changes to areas requiring the restrictions or management actions stated in this plan. Modifications to GRSG habitat would be updated in the data inventory through plan maintenance.
- Management actions may also apply to mineral material development on all surface lands with federal mineral estate, which includes federal mineral estate with BLM-administered surface lands and other surface lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- It is assumed that areas designated as ACECs under this RMPA would be subject to management plans that would match the actions analyzed in this RMPA for the protection of GRSG.
- As the current recession ends, construction activity is expected to increase and economic conditions to improve, increasing the demand for construction materials, including gravel from areas within the Sage-Grouse planning area. Federal, state, and local governments, along with non-profits and private construction firms, may increasingly look to BLM-administered lands for aggregate sources during the life of this plan. Demand for aggregate sources within the planning area may also increase to support renewable energy development due to promotion of this development in federal policies.

4.14.2 Nature and Type of Effects

The predominant mining methods for mineral materials in the planning area are surface mining of building stone and engineering materials, such as aggregate; therefore, any restrictions on surface-disturbing activities effectively close the subject areas to mineral material mining.

Closing areas to mineral material disposal would directly impact mineral materials by removing the possibility of mineral resources in that area from being accessed and extracted. Where areas are closed, new pits would relocate to nearby open areas if feasible. If demand for mineral materials could not be met by pits operated on federal lands, pits could be moved onto private or state lands where resources exist. If no mineral materials were to occur near closed areas, developers would have to transport them to construction sites from farther away. This would alter the location of mineral materials development. Closing existing mineral materials pits would exacerbate these impacts by causing more immediate relocation or reduction in mineral materials production.

Applying the 3 percent disturbance cap would directly impact mineral materials by limiting the amount of disturbance from various activities, including mineral material development. If total disturbance in GRSG habitat reached 3 percent, no additional disturbance from mineral material activities would be permitted. Because mineral material development involves surface disturbance, new development would essentially be shut down once the 3 percent cap was reached.

Managing areas as ROW avoidance or exclusion would decrease new construction (e.g., roads) and thereby decrease demand for mineral materials in those areas. This, in turn, could decrease the number of mineral material pits on federal mineral estate. In addition, new mineral material pits may not be able to be developed in areas managed as ROW avoidance or exclusion because new roads to these pits could not be constructed in exclusion areas and would be difficult to construct in avoidance areas.

Implementing management for the following resources to protect GRSG would have negligible or no impact on mineral resources for all alternatives; therefore, these resources are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management
- Livestock grazing and range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Locatable minerals

- Nonenergy leasable minerals
- Special designations
- Air quality and climate change
- Special status plants

4.14.3 Alternative A

Impacts from Lands and Realty Management

Under Alternative A, construction of new roads would likely decrease on the BLM-administered surface in the decision area that would continue to be managed as ROW avoidance or exclusion under this alternative (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). Impacts of this management would be the same type as those described under **Section 4.14.2, Nature and Type of Effects**. Impacts from this decrease in demand would be mitigated where new ROWs could be collocated within existing ROWs to satisfy valid existing rights.

Impacts from Mineral Materials (Salables) Management

Under Alternative A, mineral materials in the planning area would continue to be managed according to the allocations in the governing RMPs. A total of 3,611,700 acres (26 percent) of federal mineral estate in the decision area would continue to be closed to mineral material disposal. Impacts of these closures would be the same type as those described under **Section 4.14.2**. The remainder of the decision area (10,536,400 acres, or 74 percent) would remain open to mineral material disposal.

4.14.4 Alternative B

Impacts from Lands and Realty Management

Under Alternative B, all BLM-administered surface in PHMA would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to mineral materials disposal under Alternative B, managing PHMA as ROW exclusion would have no impact on mineral materials.

All BLM-administered surface in GHMA would be managed as ROW avoidance under Alternative B. Mineral materials beneath those acres of BLM-administered surface in GHMA would be impacted by the ROW avoidance area described under **Section 4.14.2**. More acres would be managed as ROW avoidance under Alternative B than under Alternative A, so impacts on the mineral materials program from these ROW avoidance areas would increase under Alternative B.

Impacts from Mineral Materials (Salables) Management

Under Alternative B, approximately 7,311,600 acres of federal mineral estate in PHMA (52 percent of the federal mineral estate decision area) would be closed to mineral material disposal. Existing mineral materials pits in PHMA would also be closed to new sales. The types of impacts from these closures are the same as those discussed under **Section 4.14.2**. Because twice as many acres of federal mineral estate would be closed under Alternative B compared with Alternative A, the magnitude of these impacts would increase.

Management of mineral materials on federal mineral estate outside of PHMA would be the same as that under Alternative A except that a 3 percent disturbance cap would apply to all human activity in GRSG habitat, including mineral material activities. If the cap were reached, it would impact mineral materials in GRSG habitat as described under *Nature and Type of Effects*, resulting in an increase in impacts on mineral materials compared with Alternative A.

4.14.5 Alternative C***Impacts from Lands and Realty Management***

Under Alternative C, all BLM-administered surface in occupied habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). These areas would impact mineral materials as described under **Section 4.14.2**. Because approximately 12 times more acres would be managed as ROW exclusion under Alternative C compared with Alternative A, impacts on mineral materials would greatly increase.

Impacts from Mineral Materials (Salables) Management

Under Alternative C, approximately 11,753,400 acres (83 percent) of federal mineral estate in the decision area (including all occupied habitat) would be closed to mineral material disposal. Existing mineral materials pits in occupied habitat would also be closed to new sales. The types of impacts from these closures are the same as those discussed under **Section 4.14.2**. Because three times more acres of federal mineral estate would be closed under Alternative C compared with Alternative A, the magnitude of these impacts would increase.

4.14.6 Alternative D***Impacts from Lands and Realty Management***

ROW exclusion areas would cover the same area under Alternative D as under Alternative A (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). All PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. However, because all PHMA would be closed to mineral materials disposal under Alternative D, management of ROW

exclusion or avoidance areas within PHMA would not impact new mineral materials disposal. Existing permitted sites would be impacted by decreases in demand as described under **Section 4.14.2**. These impacts on existing sites would increase compared with Alternative A because more acres would be managed as ROW avoidance under Alternative D.

Management of areas outside PHMA would be the same as that under Alternative A. Where ROW exclusion or avoidance areas outside PHMA were to overlap with areas open to mineral materials disposal, impacts would be the same type as those described under **Section 4.14.2**.

Impacts from Mineral Materials (Salables) Management

Impacts from mineral materials management under Alternative D would be similar to those under Alternative B except that, under Alternative D, existing mineral materials pits would be allowed to remain open to serve existing and planned projects in areas closed to mineral materials disposal. Existing pits would not be allowed to expand in areas closed to mineral materials disposal under Alternative D. Impacts of closing areas to mineral materials disposal are described under **Section 4.14.2**.

4.14.7 Alternative E

Impacts from Lands and Realty Management

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all Core Area habitat would be closed to mineral material disposal under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on mineral materials.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on mineral materials.

Impacts from Mineral Materials (Salables) Management

Under Alternative E, all Core Area habitat would be closed to mineral materials disposal. Existing mineral materials pits in Core Area habitat would also be closed to new sales. The acres impacted by these closures, and the impacts themselves, would be the same as those under Alternative B.

4.14.8 Alternative F

Impacts from Lands and Realty Management

Like Alternative C, under Alternative F, all occupied habitat would be managed as ROW exclusion areas. However, because GHMA would be open to mineral materials disposal under Alternative F, these areas would be impacted by ROW

exclusion areas as described under **Section 4.14.2**. Demand for mineral materials in GHMA would greatly decrease because all GHMA would be managed as ROW exclusion.

Impacts from Mineral Materials (Salables) Management

Management of mineral materials under Alternative F would be the same as that under Alternative B, with the same impacts, except that the 3 percent disturbance cap would apply to fire disturbance as well as all human activity in GRSG habitat, including mineral material activities. If the cap were reached, it would impact mineral materials as described under *Nature and Type of Effects*, resulting in an increase in impacts on mineral materials compared with Alternative A. Because fire would be included in the disturbance cap under Alternative F, the 3 percent disturbance cap is more likely to be reached, and mineral materials are more likely to be impacted.

4.14.9 Proposed Plan

Impacts from Lands and Realty Management

Under the Proposed Plan, all BLM-administered surface in PHMA would be managed as ROW avoidance areas (exclusion areas for wind and solar; see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to new mineral material disposal, mineral material activity in PHMA would already be decreased. ROW avoidance areas would have less of an independent impact on mineral materials.

All BLM-administered surface in GHMA would be managed as ROW avoidance for high voltage transmission lines, major pipelines, and wind and solar energy, but they would be open to other ROW location under the Proposed Plan. Mineral materials beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.14.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the mineral materials program from these ROW avoidance areas would increase under the Proposed Plan.

Impacts from Mineral Materials (Salables) Management

Under the Proposed Plan, approximately 7,343,300 acres of federal mineral estate in PHMA (52 percent of the federal mineral estate decision area) would be closed to mineral material disposal except new free use permits and expansion of existing pits would be allowed. Impacts would increase compared with Alternative A and would be the same type as those described under **Section 4.14.2**. Because twice as many acres of federal mineral estate would be closed under the Proposed Plan compared with Alternative A, the magnitude of these impacts would increase.

Application of the 3 percent disturbance cap and in PHMA and lek buffers in PHMA and GHMA could impact mineral material activities by preventing new

surface development. New mineral material pits or expansion of existing pits could be precluded if the cap were exceeded in an Oregon PAC (also known as BSU) and proposed project area. In cases where development was allowed, mitigation requirements would increase the cost of development. Applying lek buffer distances when approving actions would also restrict mineral material development.

4.15 NONENERGY LEASABLE MINERALS

4.15.1 Methods and Assumptions

Indicators

Indicators of impacts on nonenergy leasable minerals are as follows:

- The amount of land closed to nonenergy solid mineral leasing
- The amount of land subject to NSO stipulations on nonenergy solid mineral leasing

Assumptions

The analysis includes the following assumptions:

- New information may lead to changes in delineated GRSG habitat. New habitat areas, or areas that are no longer habitat, may be identified. This adjustment would typically result in small changes to areas, requiring the stipulations or management actions stated in this plan. Modifications to GRSG habitat would be updated in the existing data inventory through plan maintenance. In areas that are no longer habitat, the waiver/exception/modification process would be used to remove stipulations or management actions that were no longer needed.
- Management actions and conservation measures also apply to nonenergy solid leasable mineral activity on lands overlying federal mineral estate. This includes federal mineral estate underlying BLM-administered lands and lands not administered by the BLM. There are 14,148,100 acres of federal mineral estate within the decision area (12,046,100 acres of BLM-administered surface with federal minerals and 2,102,000 acres of private, state, or other federal surface with federal minerals).
- Development of traditional solid leasable minerals within the planning area is unlikely. There are no existing nonenergy solid mineral leases in the decision area. However, hardrock minerals exist beneath acquired lands in the planning area. Similar to locatable minerals, interest in developing these leasable minerals is expected to increase as precious metal values increase.

- The acreage calculations used in this analysis is the entire federal mineral estate decision area. This includes acquired lands and other lands overlying federal mineral estate. Although interest in nonenergy leasable minerals is expected only on hardrock minerals beneath acquired lands, it is possible that sodium or similar evaporate deposits could be discovered and developed in the future on other federal mineral estate.

4.15.2 Nature and Type of Effects

Closing an area to nonenergy solid mineral leasing would directly impact nonenergy leasable minerals. This would be the result of removing the possibility of minerals resources in that area from being accessed and extracted. Mining operations may move to nearby private lands, thereby reducing the number of operations on federal mineral estate. In areas open to leasing, applying NSO stipulations would restrict the ability of nonenergy leasable mineral resources to be developed or extracted. To avoid these restrictions, operators may relocate to nearby state or private minerals, which would reduce nonenergy leasable mineral development on federal mineral estate.

Applying the 3 percent disturbance cap would directly impact nonenergy leasable minerals by limiting the amount of disturbance from various activities, including nonenergy leasable mineral development. If total disturbance in GRSG habitat reached 3 percent, no additional disturbance from nonenergy leasable mineral activities would be permitted. Because nonenergy leasable mineral development involves surface disturbance, new development would essentially be shut down once the 3 percent cap was reached.

Management actions creating ROW exclusion or avoidance areas would indirectly impact nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets. For example, new roads to access a mine could not be built in a ROW exclusion area. Nonenergy solid leasable mineral operations may be moved to nearby private lands where access is easier, thereby reducing the number of operations on federal mineral estate. Because ROW avoidance areas could allow for limited ROW development, impacts of avoidance areas would be less severe than those of ROW exclusion areas. Impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs to satisfy valid existing rights.

Implementing management for the following resources to protect GRSG would have negligible or no impact on nonenergy leasable minerals for all alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros
- Wildland fire management

- Livestock grazing and range management
- Recreation
- Travel management
- Coal
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Special designations
- Air quality and climate change
- Special status plants

4.15.3 Alternative A

Impacts from Lands and Realty Management

Access to mineral resources would continue to be limited in areas managed as ROW exclusion areas and avoidance areas under Alternative A (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). This management would continue to impact the nonenergy solid leasable minerals program as described under **Section 4.15.2**, *Nature and Type of Effects*.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative A, 3,073,600 acres (22 percent) of federal mineral estate in the decision area would remain closed to prospecting and leasing. These closures would impact nonenergy leasable minerals as described under **Section 4.15.2**, *Nature and Type of Effects*.

4.15.4 Alternative B

Impacts from Lands and Realty Management

Under Alternative B, all BLM-administered surface in PHMA would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to nonenergy solid mineral leasing under Alternative B, managing PHMA as ROW exclusion areas would have no impact on nonenergy solid leasable minerals.

Impacts from Nonenergy Leasable Minerals Management

The BLM would close all PHMA to nonenergy solid mineral leasing under Alternative B. This would result in 7,217,500 acres (51 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. Alternative B would close twice the acreage, compared with Alternative A. The types of impacts from these closures described under **Section 4.15.2** would increase under Alternative B.

A 3 percent disturbance cap would apply to all human activity in GRSG habitat, including nonenergy leasable mineral activities. If the cap were reached, it would

impact nonenergy leasable minerals in GRSG habitat as described under *Nature and Type of Effects*, resulting in an increase in impacts on nonenergy leasable minerals compared with Alternative A.

4.15.5 Alternative C

Impacts from Lands and Realty Management

Under Alternative C all occupied habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all occupied habitat would be closed to nonenergy solid mineral leasing under Alternative C, managing occupied habitat as ROW exclusion would have no impact on nonenergy solid leasable minerals.

Impacts from Nonenergy Leasable Minerals Management

The BLM would close all occupied habitat to nonenergy solid mineral leasing under Alternative C. This would result in 11,699,400 acres (83 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. Alternative C would close four times the acreage, compared with Alternative A. The types of impacts from these closures described under **Section 4.15.2** would increase under Alternative C.

4.15.6 Alternative D

Impacts from Lands and Realty Management

ROW exclusion areas would cover the same area under Alternative D as under Alternative A (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). All PHMA not already managed as exclusion areas, would be managed as ROW avoidance areas. Where these exclusion or avoidance areas overlapped with areas open to nonenergy solid mineral leasing, impacts on the nonenergy solid leasable minerals program would occur, as described under **Section 4.15.2**. Because 73 percent more acres would be managed as ROW avoidance under Alternative D compared with Alternative A, the magnitude of impacts would increase.

GHMA would be open to new ROWs with each individual application being analyzed to avoid impacts on occupied habitat and minimize impacts on potential or suitable habitat within GHMA. This could increase stipulations and mitigation that applicants have to apply to ROWs located within GHMA, making them less likely to locate ROWs in GHMA. Impacts on nonenergy leasable minerals would increase compared with Alternative A; however, this management of GHMA would be less restrictive than that for other action alternatives that designate GHMA avoidance areas.

Impacts from Nonenergy Leasable Minerals Management

Under Alternative D, the BLM would apply NSO stipulations to nonenergy solid mineral leases in PHMA. These stipulations would apply on 3,270,400 acres (23 percent) of the federal mineral estate decision area. Like Alternative A, 3,073,600 acres (22 percent) of the decision area would remain closed to nonenergy solid mineral leasing. The remaining federal mineral estate in the decision area would remain open to nonenergy solid mineral leasing. Because acres would be subject to NSO stipulations under Alternative D but not under Alternative A, the impacts described under **Section 4.15.2** would increase under Alternative D.

Like under Alternative B, a 3 percent disturbance cap would apply to all human activity in GRSG habitat with the same impacts on nonenergy leasable minerals.

4.15.7 Alternative E***Impacts from Lands and Realty Management***

Similar to Alternative B, under Alternative E, all BLM-administered surface in Core Area habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all Core Area habitat would be closed to nonenergy solid mineral leasing under Alternative E, managing Core Area habitat as ROW exclusion would have no impact on nonenergy solid leasable minerals.

Management of BLM-administered surface in the decision area outside Core Area habitat would be the same as that under Alternative A, with the same impacts on nonenergy leasable minerals.

Impacts from Nonenergy Leasable Minerals Management

Management of nonenergy leasable minerals under Alternative E would be the same as that under Alternative B and with the same impacts.

4.15.8 Alternative F***Impacts from Lands and Realty Management***

Like Alternative C, under Alternative F, all occupied habitat would be managed as ROW exclusion areas (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, under Alternative F, PHMA would be closed to nonenergy solid mineral leasing; therefore, management of PHMA as ROW exclusion areas would have no impact on nonenergy solid leasable minerals.

Nonenergy solid leasable mineral operations outside PHMA would be impacted as described under **Section 4.15.2**. Because more areas would be managed as ROW exclusion areas under Alternative F, impacts would increase compared with Alternative A.

Impacts from Nonenergy Leasable Minerals Management

Management of nonenergy leasable minerals under Alternative F would be the same as that under Alternative B and with the same impacts, except that the 3 percent disturbance cap would apply to fire disturbance as well as all human activity in GRSG habitat, including nonenergy leasable mineral activities. If the cap were reached, it would impact nonenergy leasable minerals as described under *Nature and Type of Effects*, resulting in an increase in impacts on nonenergy leasable minerals compared with Alternative A. Because fire would be included in the disturbance cap under Alternative F, the 3 percent disturbance cap is more likely to be reached, and nonenergy leasable minerals are more likely to be impacted.

4.15.9 Proposed Plan***Impacts from Lands and Realty Management***

Under the Proposed Plan, all BLM-administered surface in PHMA would be managed as ROW avoidance areas for nonenergy leasable-related activities (see **Table 2-10**, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives [Excluding Mineral Resources]). However, because all PHMA would be closed to new leases and prospecting permits, managing PHMA as ROW avoidance areas would have no impact on nonenergy leasable minerals.

All BLM-administered surface in GHMA would be managed as ROW avoidance for high voltage transmission lines, major pipelines, but open to other nonenergy leasable mineral-related ROW location under the Proposed Plan. Nonenergy leasable minerals beneath those acres would be impacted by the ROW avoidance area, as described under **Section 4.15.2**. Overall, more acres in GHMA would be managed as ROW avoidance under the Proposed Plan than under Alternative A; therefore, impacts on the nonenergy leasable minerals program from these ROW avoidance areas would increase under the Proposed Plan.

Impacts from Nonenergy Leasable Minerals Management

The BLM would close all PHMA to nonenergy solid mineral leasing under the Proposed Plan. This would result in 7,247,900 acres (51 percent) of federal mineral estate in the decision area being closed to prospecting and leasing. The Proposed Plan would close twice the acreage as Alternative A. The types of impacts from these closures described under **Section 4.15.2** would increase under the Proposed Plan.

Application of the 3 percent disturbance cap and in PHMA and lek buffers in PHMA and GHMA could impact nonenergy solid leasable mineral activities by preventing new surface development. New surface development on existing leases in PHMA could be restricted if the cap were exceeded. However, the BLM would not apply the disturbance cap in a manner that would eliminate

reasonable opportunities to develop an existing lease. In cases where development were allowed for existing leases, mitigation requirements would increase the cost of development. Applying 1-k buffer distances when approving actions could also restrict development of infrastructure related to nonenergy solid leasable mineral development, as could application of RDFs.

4.16 SPECIAL DESIGNATIONS

4.16.1 Methods and Assumptions

Indicators

Indicators of impacts on special designations are as follows:

Wilderness Areas

- Potential changes in wilderness characteristics (untrammelled, natural, undeveloped outstanding opportunities for solitude or primitive and unconfined recreation, and unique or supplemental values) within the wilderness (Landres et al. 2008)
 - Untrammelled—Number of authorized actions and persistent structures designed to manipulate plants, animals, pathogens, soil, water, or fire; percent of natural fire starts that are manipulated within the boundaries of the wilderness; number of unauthorized actions by agencies, citizen groups, or individuals that manipulate plants, animals, pathogens, soil, water, or fire
 - Natural—Status of native biological communities (defined by priority habitat indicators and standards); abundance and distribution of nonindigenous species; presence of structures and development related to livestock grazing
 - Undeveloped—Index of physical development for authorized or designated structures and developments (e.g., buildings, fences, and livestock water developments); existing or potential impact of inholdings; type and amount of administrative use of motor vehicles
 - Outstanding opportunities for solitude or primitive and unconfined recreation—Level of visitor use; area of wilderness affected by travel routes; type and number of agency-provided and user-created recreation facilities; type and extent of management restrictions
 - Unique and supplemental values—Severity of disturbances of cultural resources; status of indigenous species that are listed, or are candidates for listing, as threatened or endangered

Wilderness Study Areas

- Potential changes in the inventoried wilderness characteristics (naturally appearing, opportunities for solitude or primitive and unconfined recreation, and unique or supplemental values) within the WSA
 - Naturally appearing—Status of native biological communities (defined by priority habitat indicators and standards) and abundance and distribution of nonindigenous species.
 - Opportunities for solitude or primitive and unconfined recreation—Level of visitor use; area of WSA affected by travel routes; type and number of agency-provided and user-created recreation facilities; type and extent of management restrictions
 - Unique and supplemental values—Severity of disturbances of cultural resources; status of indigenous species that are listed, or are candidates for listing, as threatened or endangered

Cooperative Management and Protection Areas

- Substantial interference of the values for which the Cooperative Management and Protection Area was designated

National Trails

- Substantial interference of the values for which the components of the National Trail System were designated

Areas of Critical Environmental Concern

- ACECs, including RNAs and ONAs, within GRSG PHMA, GHMA, and nonhabitat

Wild and Scenic Rivers

- For eligible and suitable rivers, any potential change to the ORVs, tentative classification (i.e., wild, scenic, recreational), water quality, or free-flowing condition of the river segment or corridor area from its current state
- For designated rivers, any potential change to the free-flowing river that would fail to protect and enhance the values that caused it to be designated, including its aesthetic, scenic, historic, archaeological, and scientific features

Assumptions

The analysis includes the following assumptions:

Wilderness Areas

- Wilderness Areas would continue to be managed according to the following:
 - Wilderness Act of 1964, the legislation designating them as Wilderness
 - 43 CFR, Part 6300, Management of Designated Wilderness Areas
 - Appendix A of the Committee on Interior and Insular Affairs of the House of Representatives accompanying HR 2570 of the 101st Congress (commonly called the Congressional Wilderness Grazing Guidelines)
 - BLM Manual 6340, Management of Designated Wilderness Areas (BLM 2012p)
 - Any subsequent wilderness legislation
 - As such, implementing management proposed in the various alternatives would not impair wilderness characteristics.

Wilderness Study Areas

- The WSAs in the planning area would continue to be managed according to Section 603(c) of FLPMA, BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c), and any applicable land use plan until Congress either designates or releases all or portions of the WSAs from further consideration.
- Managing the WSAs according to BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c), would protect their wilderness characteristics in a manner that would not “impair the suitability of WSAs for preservation as wilderness” (FLPMA, Section 603[c]). This is known as the nonimpairment standard.
- Actions that would “impair the suitability of WSAs for preservation as wilderness” would not be permitted unless they were to meet one of the exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c) and listed in Chapter 3.
- As a grandfathered use, livestock grazing managed in accordance with BLM regulations does not impact wilderness characteristics. However, new grazing management is not a grandfathered use and in all cases may only be established if it meets the nonimpairment standard or one of the exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c) and listed in Chapter 3.

Cooperative Management and Protection Areas

- The Cooperative Management and Protection Area in the planning area would continue to be managed according to BLM Manual 6220, National Monuments, National Conservation Areas, and Similar Designations (BLM 2012t). This policy will be adhered to during any site-specific project NEPA analyses that are conducted in the planning area.

National Trails

- The Oregon National Historic Trail in the planning area would continue to be managed according to BLM Manual 6280, Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation (BLM 2012s). This policy will be adhered to during any site-specific project NEPA analyses that are conducted in the planning area.

Areas of Critical Environmental Concern

- Management of existing ACECs, including RNAs and ONAs, was determined in the applicable RMPs to be adequate to support the relevant and important values at the time of their designation. Impacts on these ACECs are not further discussed because the BLM would continue to manage these ACECs to protect their relevant and important values.
- Although management actions for most resources and resource uses have decision area-wide application, ACEC management prescriptions apply only to those lands within each specific ACEC.
- Permitted activities would not be allowed to impair the relevant and important values for which the ACECs are designated. Locatable mineral development in ACECs is regulated through 43 CFR, Part 3809.11. Mineral development would require a plan of operations aimed at reducing impacts on ACECs. Impacts from new locatable mineral development in ACECs would be eliminated if these areas were withdrawn.
- ACEC designation provides protection and focused management for relevant values beyond that provided through general management of the relevant and important values elsewhere in the decision area.

Wild and Scenic Rivers

- All eligible and suitable stream segments under consideration for WSR designation would be managed under interim protective measures required by the WSR Act and BLM Manual 6400, Wild and Scenic Rivers—Policy and Program Direction for Identification, Evaluation, Planning, and Management (BLM 2012q). This policy will be adhered to during any site-specific project NEPA analyses that are conducted in the planning area. This procedure and the interim

protective measures would ensure that the values for which these river segments were found eligible or suitable are not compromised until Congress makes a decision regarding WSR designation.

- The BLM would not permit any actions that would adversely affect the free-flowing condition, water quality, ORVs, or tentative classification of any eligible or suitable segments. As such, implementing management actions in this RMPA/EIS would not adversely impact these segments; adverse impacts are not discussed for any of the alternatives.

4.16.2 Nature and Type of Effects

Implementing management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that disturb the surface or could otherwise threaten the values for which special designations are managed. Energy development, livestock grazing, travel, mineral extraction, wildland fires, and construction within ROW grants are all actions that could reduce the quality of the values for which special designations are managed.

Protecting areas from these activities to protect GRSG would also protect special designations from disturbance.

Wilderness Areas

Implementing management proposed in the various alternatives would not impair wilderness characteristics. This is because these wilderness characteristics are protected and managed according to the legislation, regulation, and policy listed under **Section 4.16.1, Methods and Assumptions**. Management to protect GRSG could enhance naturalness, or, at a minimum, be complementary to management in Wilderness Areas.

Wilderness Study Areas

Due to the requirement that any activity in WSAs meet the nonimpairment standard described in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012c), implementing management proposed in the various alternatives would not impair wilderness characteristics. Management to protect GRSG could enhance naturalness, or, at a minimum, be complementary to management in WSAs.

Cooperative Management and Protection Areas

Implementing management proposed in the various alternatives would have no or negligible effects on the Steens Mountain Cooperative Management and Protection Area. This is because the area is managed according to the policy listed under **Section 4.16.1, Methods and Assumptions**.

National Trails

Implementing management proposed in the various alternatives would have no or negligible effects on Oregon National Historic Trail resources, qualities,

values, and associated settings, and the primary use or uses. This is because the Oregon National Historic Trail is managed according to the policy listed under **Section 4.16.1, Methods and Assumptions.**

ACECs

Impacts on the relevant and important values of ACECs would mainly be from surface-disturbing activities and wildfires. Specifically, these are the activities that cause direct damage to the values, introduce modifications to the landscape that affect the area's scenic quality or historical or cultural context, or that result in erosion, sedimentation, or increased runoff.

Special status species management objectives would prevent degradation of, and could improve, relevant and important values where an ACEC is designated to protect such values. The BLM management could protect the relevant and important values in ACECs independent of an ACEC designation. Refer to **Section 4.3, Special Status Species—GRSG**, for a discussion of impacts on GRSG habitat.

In general, management actions that protect resources (such as surface-disturbance restrictions, management for desired habitats, travel restrictions and closures, and recreation restrictions) would help maintain and improve the important and relevant values within ACECs. Management actions that create the potential for resource degradation (such as mineral development, livestock grazing, and infrastructure development) could impact the relevant and important values for which an ACEC is designated. Recreation and travel within ACECs could impact their values. Limiting motorized travel to existing routes and trails would reduce surface disturbance and the potential for related GRSG habitat loss. Restrictions on uses could also impact ACECs, particularly RNAs. RNAs could be impacted by management actions that prohibit natural processes to proceed to the detriment of the plant communities for which the RNAs were created. Management actions that do not promote the maintenance of plant communities could also impact RNAs.

Identifying ACECs as ROW exclusion or avoidance areas would protect relevant and important values by reducing (for avoidance areas) or eliminating (for exclusion areas) impacts from development requiring a ROW permit. Such developments include utilities, access roads, and renewable energy projects. Impacts from ROW development on GRSG habitat include compaction, erosion, and potentially habitat fragmentation

Energy and mineral development could impact ACEC values by increasing soil erosion potential and by removing or disrupting unique vegetation. Where GRSG habitat exists, energy and mineral development could degrade and fragment habitat. Construction, operation, and maintenance could disturb GRSG populations. However, the protections and limitations needed to maintain the relevant and important values of each ACEC are included in the plans that manage those ACECs. Additionally, closing ACECs to fluid mineral leasing or

applying NSO stipulations would help protect relevant and important values by eliminating surface-disturbance associated with such development.

Depending on their extent, location, and severity, wildfires could cause short- and long-term damage to ACEC values, particularly by removing important sagebrush habitats. Emergency stabilization and restoration would be applied to minimize impacts where special values are at risk. If these techniques are successful, wildfires could also improve ACEC values in the long term by maintaining natural vegetation ecosystem cycles. Additionally, prescribed fuels treatments could protect ACEC values if these treatments were to reduce the risk of future wildfire damage to ACEC values.

Livestock grazing above moderate levels of utilization could impact ACEC values, depending on what the values are for each ACEC, by increasing the potential for soil erosion, increasing annual grasses, reducing understory plant species, and affecting the plant communities that are the values for which the ACEC was designated. Closing ACECs to livestock grazing could help protect relevant and important values by eliminating soil and vegetation disturbance associated with livestock grazing; however, this could also increase the risk for fire due to increased fuel loads. Closing ACECs to livestock grazing could especially impact RNAs. Closing portions of RNAs that contain plant communities important to GRSG could provide the BLM with areas for baseline vegetation monitoring without the influence of BLM-permitted activities. This could allow natural succession processes to proceed, enabling the BLM to use these areas as comparative controls to treated areas. In addition, the BLM could research the impacts of climate change on plant communities within these undisturbed vegetation communities. Management to protect GRSG under the various alternatives would likely provide additional protections for existing ACECs and, at a minimum, would provide complementary management. This would be particularly true in ACECs where GRSG conservation was identified as a value. Additionally, RNAs would not experience impacts due to the restrictions and limitations on uses in place to protect RNAs. Impacts would not be expected to vary greatly between the alternatives.

Wild and Scenic Rivers

Stream segments eligible or suitable for inclusion in the National Wild and Scenic Rivers System are contained within an interim boundary within which resources are managed to protect the segments' free-flowing condition, water quality, ORVs, and tentative classification. Unless a detailed river boundary is established, the interim boundary of the WSRs is one quarter-mile from the ordinary high water mark on either side of the river (BLM 2012q). GRSG could use wet meadows within the interim boundary of these rivers during the summer; however, management for the species will not adversely impact the free-flowing condition, water quality, ORVs, or tentative classifications of the segments.

Implementing management for the following resources would have negligible or no impact on special designations for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Vegetation
- Wild horses and burros
- Wildland fire management
- Travel Management
- Leasable minerals
- Locatable minerals
- Mineral materials (salables)
- Nonenergy leasable minerals
- Mineral split-estate
- Special status plants

4.16.3 Impacts Common to All Alternatives

All of the action alternatives and the Proposed Plan would result in greater restrictions on resource uses and surface-disturbing activities than would Alternative A. These restrictions could result in impacts on special designations by providing additional protection of the values for which the special designations are managed. All special designations would likely be enhanced by or would not experience impacts from GRSG management and restrictions.

Implementing management proposed in the various alternatives would have no or negligible effects on Wilderness Areas, WSAs, Cooperative Management and Protection Areas, National Historic Trails, and Wild and Scenic Rivers. This is because the BLM will adhere to the applicable laws, regulations, policy, and guidance for those areas, as described in **Section 4.16.2, *Nature and Type of Effects***.

Under all alternatives, the 91 existing ACECs and RNAs would continue to be managed for the values for which they were designated. Of those 91 existing ACECs, 76 ACECs occur wholly or partially within GRSG habitat (See **Section 3.16, Areas of Critical Environmental Concern**, and **Appendix J, Areas of Critical Environmental Concern Evaluation for Greater Sage-Grouse**). The 76 ACECs occurring in GRSG habitat would likely experience indirect protections from GRSG management actions. Additionally, 33 of these ACECs and RNAs have been identified as having a majority of their total acres in PHMA. These ACECs, as well as other ACECs that contain occupied GRSG leks or large amounts of GRSG habitat, would receive special management protection under all alternatives and the Proposed Plan. This special management attention is described in **Section 3.16, Areas of Critical Environmental Concern**. Under all alternatives, the 91 existing ACECs would be managed to protect the relevant and important values from irreparable damage.

ACECs would experience some variation in impacts across alternatives due to impacts from the management of other resources. Some alternatives would also designate additional ACECs, or change the degree of protection placed on existing ACECs, which would result in variation in impacts across the alternatives.

These variations are described below.

4.16.4 Alternative A

The existing ACECs experience varying degrees of protection under the current management. Most of the existing ACECs are identified as ROW avoidance areas, most are recommended for withdrawal for locatable minerals, and most are closed or withdrawn from salable and leasable mineral development.

These actions under the current management provide protection to the 91 existing ACECs. The seven ACECs in PPH or PGH that include GRSG among the relevant and important values for which they were designated are included within the 76 ACECs identified in **Chapter 3** and would be most likely to experience supplementary protection under the action alternatives from management actions related to GRSG protection. However, all of the ACECs that contain PPH or PGH are likely to experience some degree of supplemental protection under the action alternatives. The action alternatives would be more restrictive than Alternative A in dealing with resources such as livestock grazing and ROW management.

There are more acres of PPH and PGH open to livestock grazing (9,982,126 acres) under Alternatives A and B than under any of the other alternatives. Therefore, compared with the other alternatives, ACECs would experience fewer of the incidental protections resulting from closing acres to livestock grazing under these alternatives. Additionally, Alternatives A and D have fewer acres of ROW exclusion areas (545,349 acres) in PPH and PGH than the other alternatives. This would likely result in fewer indirect protections of ACECs.

Alternative A is the only alternative that allows cross-country motorized travel in PPH other than the Proposed Plan, which allows less than 50 acres. It also manages more acres (2,940,051) as open to cross-country motorized travel in PGH than any of the other alternatives. ACECs are least likely to experience protection from the impacts of motorized travel under Alternative A.

The effects of having more acres open to livestock grazing and motorized travel, and fewer ROW exclusion areas are described in **Section 4.16.2, Nature and Type of Effects**.

4.16.5 Alternative B

The same number of acres is open to livestock grazing under Alternative B as under Alternative A; thus, impacts on ACECs are similar.

More than eight times more acres of PHMA and GHMA would be ROW exclusion areas under Alternative B (4,547,043 acres) than under Alternative A (545,349 acres). Where ACECs overlap ROW exclusion areas, this would likely result in more indirect protection of ACECs than under Alternative A, as described in *Nature and Type of Effects*.

Under Alternative B, cross-country motorized travel would not be permitted in PHMA. This would result in indirect protections to ACECs that contain PHMA. These ACECs would experience protections from the types of impacts caused by motorized travel that are described in **Section 4.16.2, *Nature and Type of Effects***.

4.16.6 Alternative C

Under Alternative C the most acres are closed to livestock grazing (10,218,545 acres) out of all the alternatives. This would likely result in more indirect protections of ACECs than under the other alternatives. The effects of closing acres to livestock grazing on ACECs are described in **Section 4.16.2, *Nature and Type of Effects***.

The same amount of PHMA would be ROW exclusion areas under Alternative C as under Alternative B. In addition, 5,669,422 acres of GHMA would be ROW exclusion areas. Where ACECs overlap ROW exclusion and avoidance areas, this would likely result in more indirect protection of ACECs than under Alternative A, as described in *Nature and Type of Effects*.

All PHMA would be closed to cross-country motorized travel. Impacts would be the same as those described under Alternative B.

Under Alternative C all PHMA would be designated as new ACECs designated for GRSG conservation. Information on the additional ACECs under Alternative C is available in **Appendix J, Areas of Critical Environmental Concern Evaluation for Greater Sage-Grouse**.

4.16.7 Alternative D

Alternative D has the same number of acres of ROW exclusion areas (545,349 acres) in PHMA and GHMA as Alternative A. Therefore, impacts on ACECs are similar as those described under Alternative A. All PHMA under this alternative would be closed to cross-country motorized travel. Impacts would be the same as those described under Alternative B.

Under Alternative D, 9,923,018 acres would be open to livestock grazing, which is 59,108 fewer acres than would be open under Alternative A. Due to the smaller number of acres open to grazing, as well as to additional measures that would be in place under this alternative to protect RNAs, ACECs would likely experience fewer impacts from livestock grazing under Alternative D than under Alternative A.

Additionally, under Alternative D, ACECs and RNAs with large proportions of GRSG habitat (ACECs and RNAs occurring in over 30 percent PHMA and 50 percent GHMA) would be managed for GRSG conservation. The ACECs also would be managed for the existing values for which they were designated. This would likely increase resource use restrictions and surface-disturbance within those ACECs; consequently, it would provide the ACECs with more protections, such as those discussed under **Section 4.16.2, *Nature and Type of Effects***.

Unlike the other action alternatives, Alternative D includes specific management actions for RNAs, a unique type of ACEC managed for minimum human disturbance. This would result in increased protections to RNAs through management actions that would prohibit OHV use in identified RNAs, work with livestock grazing permit holders to reduce livestock grazing, remove unnecessary infrastructure, work with public holders of existing valid rights and ROW holders to address RNA plant community protection, and use minimally disturbing fire suppression tactics. Additionally, under Alternative D, RNAs can be closed to public use if the BLM determines public use is incompatible with the values of the RNA.

These management actions could enhance the values of the RNAs.

4.16.8 Alternative E

Under Alternative E, 125,776 acres of Core and Low Density and Currently Occupied Habitat would be closed to livestock grazing. This is the fewest acres out of all the alternatives and would likely result in fewer incidental protections of ACECs. The effects of keeping acres open to livestock grazing are described in **Section 4.16.2, *Nature and Type of Effects***.

The same amount of core habitat (PHMA under the other action alternatives) would be ROW exclusion areas under Alternative E as under Alternative B. In addition, 156,523 acres of low density habitat and currently occupied habitat would be ROW exclusion areas. Impacts on ACECs would be similar to those described under Alternative B.

Additionally, all Core Habitat would be closed to cross-country motorized travel, resulting in indirect protections to ACECs that contain Core Habitat. Impacts would be the same as those described under Alternative B.

4.16.9 Alternative F

Alternative F would designate 17 new ACECs to conserve GRSG. Additional information on these ACECs and the values for which they would be designated is available in **Appendix J, Areas of Critical Environmental Concern Evaluation for Greater Sage-Grouse**.

Under Alternative F, 7,506,632 acres of PHMA and GHMA would be open to livestock grazing. This is 2,475,494 fewer acres than under Alternative A. It

would result in fewer impacts from livestock grazing on ACECs than under Alternative A.

The most acres of PHMA and GHMA would be designated as ROW exclusion under Alternatives F and C. Impacts would be the same as those described under Alternative C.

All PHMA would be closed to cross-country motorized travel under this alternative, resulting in indirect protections to ACECs that contain PHMA. Impacts would be the same as those described under Alternative B.

4.16.10 Proposed Plan

Impacts from livestock grazing on ACECs would be less under the Proposed Plan than under Alternative A. Under the Proposed Plan, 25,573 more acres of PHMA and GHMA would be closed to livestock grazing than under Alternative A (169,902 acres would be closed under Alternative A, and 195,475 acres would be closed under the Proposed Plan). This would result in more incidental benefits to ACECs where acres closed to livestock grazing under the Proposed Plan overlap with or are next to ACECs. Around 10 percent of the acres (22,765 acres) closed to grazing under the Proposed Plan are within key RNAs. Closing these acres to livestock grazing would allow natural succession to proceed without interference from BLM-permitted activities, such as grazing, and would result in the types of impacts discussed under *Nature and Type of Effects*.

Under the Proposed Plan, 558,923 more acres would be managed as ROW exclusion, and 12,435,558 more acres would be managed as ROW avoidance than under Alternative A. This would likely result in more incidental protection of ACECs containing PHMA and GHMA.

Less than 50 acres (and 5,609,165 fewer acres than under Alternative A) of PHMA and GHMA would be open to cross-county travel under the Proposed Plan, which would likely result in incidental protection of ACECs containing PHMA and GHMA.

Under the Proposed Plan, no new ACECs or RNAs would be designated; however, the BLM would identify 3 existing ACECs and 15 existing RNAs as key for GRSG conservation. Two of the three key ACECs already identify GRSG as a value for which the ACEC was designated. For the third ACEC, Abert Rim, for which GRSG is not an identified value, GRSG would be added as a value. In 13 of the 15 key RNAs, 22,765 acres would be closed to livestock grazing, and RNAs would be fenced to allow plant communities to undergo natural succession and be available for future research needs. An additional 800 acres next to RNAs would also be fenced to minimize impacts on existing leks. All other RNAs that are open to livestock grazing would continue to be open. The RNAs that would be closed to livestock grazing would experience impacts similar to those described under *Nature and Type of Effects*.

4.17 SOIL RESOURCES

4.17.1 Methods and Assumptions

Indicators

Indicators of impacts on soil resources are as follows:

- Declining soil surface health, as expressed through physical or chemical degradation, either with soils that are unable to support vegetation or soils that are not up to the potential for a particular ecological site (e.g., vegetation type, diversity, density, and vigor)
- Acres of BLM-administered land added to or removed from specific grazing practices
- Acres of BLM-administered land protected from or open to surface-disturbing activities
- Acres of invasive plant species that intrude during ground disturbing activities or after instances of fire

Land uses strive to conform to Standards for Public Land Health (described in Section 3.17, Soil Resources), which describe conditions needed to sustain public land health and relate to all uses of the public lands.

Assumptions

The analysis includes the following assumptions:

- Soils on BLM-administered lands will be managed to maintain inherent productivity and promote sustained yields, while keeping erosional mechanism at minimal and acceptable levels thus preventing physical or chemical degradation. Proposed surface-disturbing projects will be analyzed to determine suitability of soils to support or sustain such projects and will be designed to minimize soil loss.
- Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management (described in **Section 3.8**, Livestock Grazing and Range Management) generally are effective in managing the effects on soils from livestock grazing when properly implemented and monitored. Grazing authorizations will be adjusted on a case-by-case basis when site-specific studies indicate changes in management are needed.
- BLM management actions and objectives will be consistent with soil resource capabilities.
- Fuels projects and planned or unplanned fires that contribute to establishing a more natural fire regime would have long-term benefits to soil health.

4.17.2 Nature and Type of Effects

Activities that displace or mix soil horizons, compact, or contaminate soils, or that remove vegetation from soils are generally considered to negatively affect soil quality or soil health. These impacts on soil resources from surface disturbing activities result from a number of causes, including unmanaged livestock grazing, some allowed forms of recreation, mineral resource activities, and road improvement or construction. The intensity and extent of these impacts are determined in part by the type and location of the surface-disturbing activities and surface occupancy. Impacts on soil resources can also be affected by any applicable stipulations and plans of operation. Examples are those that address site-specific environmental concerns and require mitigation to stabilize soil, to prevent unnecessary erosion, and to revegetate disturbed surfaces. Land management actions that prohibit surface disturbance, such as areas closed to mineral entry, are more protective of soil resources than land management that allows surface disturbing activities.

Management to protect GRSG involves reducing or otherwise restricting land uses and activities that remove vegetation or biological crusts, disturb the upper soil horizons, or that may compact the soil surface and thus allow erosion of the soil. Livestock grazing, mineral extraction, recreation, and construction within ROW grants have all been identified as having compaction and erosion effects on soils. Designations such as ROW exclusion and avoidance areas and stipulations such as NSO and CSU mitigate compaction and erosion effects on soils. Protecting areas from these activities for the benefit GRSG would also protect soils from disturbance, compaction, and the removal of vegetation or biological crusts.

Surface-disturbing activities and surface occupancy can impact soil resources by compacting soil. In some cases, on very sandy soils, soil compaction aids in water retention and thus plant establishment and growth. However, too much compaction decreases water infiltration rates and gas exchange rates reducing soil health. Decreased gas exchange rates can cause aeration problems, induce nitrogen and potassium deficiency, and negatively impact root development, which is a key component of soil stabilization. As soil compaction increases, the soil's ability to support vegetation diminishes. This is because the resulting increase in soil strength and change in soil structure (loss of porosity) inhibit root system growth and reduce water infiltration. As vegetation cover, water infiltration, and soil stabilizing crusts are diminished or disrupted, the surface water runoff rates increase, further accelerating rates of soil erosion.

Travel across land by most means can result in vegetation loss, loss of biotic crusts, soil compaction, or soil erosion. Management approaches that designate travel to specified routes can result in more predictable, localized and manageable impacts. Selectively locating travel routes away from areas of sensitive soil conditions can minimize the extent of these effects, ideally limiting them to the footprint of the trail itself.

Recreation on BLM-administered lands may result in vegetation loss, soil compaction, and soil erosion. The effects of recreation on soil resources are determined by the severity and intensity of the recreation taking place. Areas with large number of visitors and/or mechanized recreation have a greater chance of resulting in some of the detrimental effects than lower impact, lower number recreation areas. There are a number of activities that have minimal impacts.

Lands and realty management decisions affect where ground-disturbing activities can and cannot occur. Ground-disturbing activities could result in the compaction and/or, the erosion of soils, or vegetation loss, all of which reduce soil stability. In areas with NSO stipulations and managed as ROW exclusion, soil quality would be protected since ground disturbance would be prohibited and soil erosion would be limited to natural processes. In areas managed as ROW avoidance, soil quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on soil resources due to more restrictive conditions of use associated with ROW authorization compared with areas not managed as ROW avoidance.

Improper livestock and wild horse and burro management can affect soil resources, especially in wet areas, around springs and troughs, and near salt blocks. Wild horses and burros and domesticated livestock often use riparian and wetland areas for water and shade, and may congregate around water developments which results in compacted soil and trampled nearby vegetation. Unmanaged livestock grazing and wild horse and burro populations above AML can lead to patchy loss of vegetation cover, reduced water infiltration rates and nutrient cycling, decreased plant litter, degraded water quality, increased bare ground, and soil erosion (Manier et al. 2013). Land health evaluations, appropriate management levels, rangeland monitoring studies, and rangeland health standards are used to assess rangeland condition and help to identify where a change in livestock grazing or wild horse and burro management would be beneficial.

Fluid mineral development generally requires both permanent and temporary roads, drilled wells, and associated well pads. In addition, fluid mineral development may require associated pipelines and transmission lines, along with the construction of necessary service roads for these facilities. Local soil health and characteristics within project footprints are typically impacted by compaction and vegetation clearing for road or structural development. Effects or impacts from mineral activity is regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval which have reduced the amount of soil disturbance on a case-by-case basis.

Locatable minerals, mineral materials, and nonenergy leasable mineral activities require road construction and large areas of soil excavation. Local soil health

and characteristics within project footprints are typically negatively impacted by excavation, compaction, erosion, and vegetation clearing. Restoration and restoring vegetation may return a lower level of soil health over the long term, once mineral extraction is complete; however, landscapes are changed permanently as areas of prior soil cover are often permanently altered through such features as open pits.

Implementing management for the following resources would have negligible or no impact on soil resources for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Recreation
- Coal
- Special designations
- Air quality and climate change
- Special status plants

4.17.3 Impacts Common to All Alternatives

Impacts from Vegetation Management

Habitat restoration would occur under all alternatives and would be implemented based on environmental variables that indicate areas most likely to succeed in restoration and therefore benefit GRSG. Restoring habitat has a beneficial effect on soils over the long term. Vegetation management is initially disturbing to soils as undesirable vegetation is removed through cutting or burning, and as desirable seed is planted, at times using heavy equipment. Success of vegetation management may not result in soil health improvements for years after initial disturbance. Soils that have a high restoration potential value would tend to support restorative vegetation activities due to proper soil conditions, such as low salt content, adequate water retention, and available rooting depth. High potential restoration soil must combine with favorable environmental conditions such as precipitation and temperatures to be successful. If success is not obtained then reintroducing plantings or seeding must reoccur for success to occur.

Vegetation management would also aim to reduce and prevent the spread of invasive plants under all alternatives. Displacement of native plants by invasive plants results in changes in the soil properties, such as soil temperatures and soil water distribution, which may result in bare ground or the inability to support the ecological site. Quick growing invasive plants like cheatgrass and medusahead increase the likelihood of wildfires by drying out earlier and remaining dry longer than other plants in the vegetation community, resulting in an excessive buildup of extremely flammable standing cheatgrass and litter. Areas dominated by invasive annual grasses typically have a much shorter fire return interval than other types of vegetation. An increased fire frequency

pattern results in further changes to soil properties and increased soil erosion rates.

Impacts from Leasable Minerals Management

While there is potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; therefore, impacts on soil resources from development as described in **Section 4.17.2** would be limited.

Impacts from Locatable Minerals Management

Locatable minerals could exist in the planning area, but exploration has been minimal and the potential is unknown across all alternatives. The difference in potential management effects on soil resources from locatable mineral entry and mineral material disposal under each alternative is the number of acres that would be recommended for withdrawal or closed from mineral entry. The greater the amount of land withdrawn from locatable mineral entry, the more protective of soil resources the alternative is, due to eliminating the potential for impacts, as described in **Section 4.17.2**.

Impacts from Nonenergy Leasable Minerals Management

While there is potential for development, there have been no wells developed on the leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; thus, impacts on soil resources from development as described in **Section 4.17.2** would likely be limited and occur independent of areas available for leasing or stipulations applied.

Impacts from Mineral Split-Estate Management

For the purposes of impacts on soil resources, split-estate minerals would be similar to that described above by category of minerals.

Wild Horses and Burros

Under all alternatives, wild horse and burro populations above AML results in impacts on soil resources through overgrazing, trampling or removing vegetation and compaction of soils resulting in bare ground in upland areas and near water resources around which wild horses may congregate for water and shade. AMLs of wild horse and burro populations and land health evaluations to assess rangeland health would be utilized under all alternatives to reduce and minimize these impacts.

Wildland Fire Management

Under all alternatives, wildland or prescribed fire will affect soil resources depending on the severity, intensity, and regime of the fire and on how much heat is transferred to the soil during a fire event. Short term effects after a fire include the loss of vegetation cover resulting in increased susceptibility of soil erosion. Long term effects of fire result from the process of soil heating, which

can cause significant changes in the physical, chemical, and biological properties that are relevant to the future productivity and sustainability of wildland sites. Such degradation may increase the soils susceptibility to invasive plants, if seed sources are present, until native vegetation reestablishes (Forest Service 2005). Conversely, managing for the suppression of wildfires results in soil disturbance and compaction during the removal of excess vegetation.

4.17.4 Alternative A

Impacts from Wild Horses and Burros

Alternative A would continue to manage HMAs at the current AML and to evaluate AMLs based on existing management. Alternative A would continue to manage water resources and range improvements in the current manner, which would continue to support the current disbursement of wild horses and burros on the landscape. Appropriate distribution reduces the occurrence of concentrated soil compaction and vegetation trampling and resulting soil erosion from wild horse or burro congregation.

Impacts from Livestock Grazing and Range Management

Under Alternative A, 12,258,337 acres, or 98 percent of the planning area would continue to be managed as open to livestock grazing; 253,504 acres or 2 percent of the planning area is closed to livestock grazing. Of the acres open to livestock grazing, 4,470,799 acres (36 percent) are within PPH and 5,511,327 acres (44 percent) are within PGH on BLM-administered lands.

All permits and leases under Alternative A would continue to be required to meet or make progress toward meeting standards defined in the Oregon and Washington Public Land Health Standards (described in **Section 3.8**, Livestock Grazing and Range Management). Grazing permits, including grazing systems, permitted AUMs, and allotment boundaries would be modified as necessary to conform to Standards and Guidelines for Livestock Grazing Management. Changes to rangeland management would be directed first to allotments not meeting land health standards, which may include changes in number of permitted AUMs, or current timing, duration, or frequency of permitted used, including temporary closures.

Alternatives A, B, and E have the same amount of acreage managed as open to livestock grazing. These alternatives would subject the greatest acreage of soil resources to the short-term impacts on vegetation and the long-term impact on biological soil crusts due to livestock grazing as outline in **Section 4.17.2**. Impacts that include potential loss of vegetation cover or biological crusts would lead to increased bare ground, invasive plants, and potential soil erosion.

Impacts from Travel Management

Alternative A would manage 6,811,890 acres (54 percent) of the planning area as open to cross-country motorized travel, 300,328 acres (2 percent) of the planning area as closed to cross-country motorized travel, and 5,325,377 acres

(42 percent) as limited to existing roads and trails, with possible additional seasonal or vehicle type restrictions. Alternative A would manage the most acres as open to cross-country motorized travel, which subjects the most acres of soil resources to the possible impacts caused by overland travel as described in **Section 4.17.2**. The potential effects of travel management on soil resources are vegetation loss, loss of biotic crusts, soil compaction, and soil erosion.

Impacts from Lands and Realty Management

Under Alternative A, 857,564 acres (7 percent of the planning area) would continue to be managed as ROW exclusion areas, and 3,445,685 acres (27 percent) would continue to be managed as ROW avoidance areas. Alternative A would manage 8,314,779 acres (66 percent) of the planning area as open to potential ROW authorizations. Of the acres managed as ROW exclusion areas, 257,154 acres are located within PPH and 288,195 acres are located within PGH. Of the acres managed as ROW avoidance areas, 1,336,146 acres are located within PPH and 1,672,025 acres are managed within PGH. Alternative A would manage the least amount of exclusion and avoidance areas, and would leave the largest acreage open to ROW authorizations, which could result more surface disturbance from ROW development than the other Alternatives.

Within exclusion areas new ROW development would continue to be prohibited, which would prevent surface disturbance from ROW development. Within avoidance areas, the BLM would require ROW applicants to observe additional conditions, such as siting criteria and design requirements. This could discourage new ROW development in these areas. Within areas open to ROW authorization, soil resources may be affected by ROW development, including potential vegetation loss and soil compaction. However, any effects on soil resources from ROW authorizations would be limited to the footprint of the disturbance area within the ROW. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Impacts from Energy and Mineral Development

Alternative A is the least restrictive on energy and mineral development of all the alternatives. As a result, the indirect impacts of development on soil resources as discussed in **Section 4.17.2** (including soil compaction and excavation, and the clearing of vegetation) would be the greatest under this alternative.

Locatable Minerals

Under Alternative A, 1,435,911 acres (10 percent) would be managed as withdrawn from locatable mineral entry, 12,687,910 acres (90 percent) would be managed as open to mineral entry, and 24,443 (less than 1 percent) would be recommended for withdrawal. Alternative A would manage the most acres as open to locatable mineral entry, which could open soil resources to possible

impacts caused by locatable mineral exploration or development, as described in **Section 4.17.2**.

Mineral Materials

Alternative A would manage 3,611,745 acres (26 percent) as closed to mineral material disposal and 10,536,510 acres (74 percent) as open to mineral material disposal. This alternative would manage the most acres for mineral material disposal, which could open soil resources to possible impacts caused by mineral material disposal, as described in **Section 4.17.2**.

Nonenergy Leasable Minerals

Alternative A would manage 3,073,567 acres (21 percent) as closed to nonenergy leasables and 10,648,648 acres (75 percent) as open to nonenergy leasables. This alternative and Alternative D would manage the most acres as open for nonenergy leasable mineral exploration and development, which could open soil resources to possible impacts as described in **Section 4.17.2**.

Fluid Minerals

Fluid minerals are managed with progressive restrictions that result in greater protection from surface-disturbing activities that can result in soil compaction and other impacts as described Section 4.17.2. Fluid minerals are managed as open to fluid mineral exploration and development, open with conditional use restrictions, or CSU, open with NSO or closed to fluid mineral entry. Under Alternative A, 5,509,091 acres (38 percent) of the planning area would be managed as open, 4,281,931 acres (30 percent) would be managed with CSU, 860,017 acres (6 percent) would be managed with NSO, and 3,497,102 acres (25 percent) would be managed as closed. Under Alternative A, fluid mineral resources in the planning area would continue to be managed according to any closures, stipulations, or BMPs in the governing RMPs. Alternative A would have the most acres open to fluid mineral entry and the fewest managed as open with restrictions, resulting in the greatest potential for impacts on soil resources, as described under **Section 4.17.2**.

4.17.5 Alternative B

Impacts from Wild Horse and Burro Management

Alternative B would amend HMAPs to incorporate GRSG habitat objectives and would prioritize the evaluation of all AMLs based on indicators that address the structure, condition, and composition of vegetation and measurements specific to achieving GRSG habitat objectives. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition, which would result in healthier soils.

Impacts from Livestock Grazing and Range Management

Under Alternative B, management actions would not result in direct changes to the number of acres open or closed to livestock grazing. GRSG habitat objectives and management considerations would be incorporated into all BLM

grazing allotments through AMPs or permit renewals, and land health assessments would be prioritized to permits in PHMA. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition, which would result in healthier soils due to appropriate vegetation composition and cover. This would reduce cases of soil compaction or erosion.

Impacts from Travel Management

Under Alternative B, 4,141,539 acres (33 percent of BLM-administered surface land) would be managed as open to unrestricted cross-country motorized travel, 300,328 acres (2 percent) would be managed as closed to cross-country motorized travel, and 7,996,165 acres (63 percent) would be limited to existing roads and trails. This equates to a 21 percent reduction in lands open to cross-country motorized travel and a 21 percent increase in lands managed as limited to existing roads and trails. This would be more protective of soil resources from the potential effects of cross-country motorized travel (described **Section 4.17.2**) than Alternative A. Additionally, new route construction would be limited to realigning existing routes, new roads would be built to the absolute minimum standard necessary. Any roads and trails not designated in travel management plans would be restored using appropriate seed mixes. Restoration of roads would benefit soil resources by reducing total overall acres of soils affected by travel management through replacement of cleared vegetation, and correcting areas where soils are compacted or eroding above natural levels.

Impacts from Lands and Realty Management

Alternative B would manage 4,866,030 acres (39 percent) as ROW exclusion, 6,106,923 acres (48 percent) as ROW avoidance, and 1,645,075 acres (13 percent) as open to ROW authorizations. GHMA would be managed as a ROW avoidance area on 5,662,623 acres and PHMA would be managed as a ROW exclusion area on 4,547,043 acres. Compared with Alternative A, Alternative B would be more protective of soil resources from potential impacts from ROW authorizations due to greater acreage of exclusion areas. Alternative B would increase the acreage managed as ROW exclusion areas by 4,008,466 acres or 32 percent, would increase the acreage managed as ROW avoidance areas by 2,661,238 acres or 21 percent, and would decrease the acreage open to ROW authorizations by 6,669,704 acres, or 53 percent compared with Alternative A. Additionally, Alternative B would implement a 3 percent disturbance cap on all human activity in GRSG habitat, including ROW leasing which would limit ROW leasing in the open areas within habitat.

Alternative B would increase the protection of soil health because ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization. This reduces the amount of vegetation clearing and soil compaction occurring compared with a ROW authorization, if one is authorized. Regardless of ROW designation, any authorized ROW effects on soil resources would be limited to the footprint of the disturbance area within the ROW. The BLM would analyze impacts from individual ROW

authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Alternative B would also remove power lines and reclaim ROW sites that are no longer in use, which would restore the surrounding habitat and reverse the vegetation clearing and soil compaction effects of ROW authorizations.

Impacts from Energy and Mineral Development

Alternative B would be more protective of soil resources from vegetation clearing, soil compaction, and soil excavation than Alternative A due to more restrictions on energy and mineral developments. Specific acreage differences under the various mineral resources are detailed below. Additionally, a 3 percent disturbance cap would apply to all human activity in GRSG habitat, including energy and mineral development where this land is open to such uses within GRSG habitat.

Locatables

Alternative B would manage 1,435,911 acres (10 percent) as withdrawn from locatable mineral entry and would recommend an additional 4,587,713 acres (32 percent) in PHMA and GHMA for withdrawal from locatable mineral entry. The remaining 8,124,640 acres, or 57 percent of the planning area, would be managed as open to locatable mineral entry with appropriate RDFs (to the extent consistent w/ applicable law) as outlined in **Appendix C**. Areas recommended for withdrawal would be considered based on risk to GRSG and its habitat.

Mineral Materials

Alternative B would manage 7,311,595 acres (52 percent) as closed to mineral materials disposal and 6,836,659 acres (48 percent) as open to mineral materials disposal. This is a reduction in 3,699,851 acres open to mineral materials disposal from Alternative A. Alternative B would also mandate the restoration of mineral pits no longer in use within PHMA and would return these areas to land that meets GRSG habitat conservation objectives. The reduction in acreage, 3 percent disturbance cap, and mandate for restoration would provide for less disturbance to soil resources than Alternative A.

Nonenergy Leasable Materials

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 7,217,528 acres (51 percent) and open to mineral entry exploration and development on 6,928,382 acres (49 percent). This is a 3,720,266 acre reduction in areas open to nonenergy solid leasable exploration and development compared with Alternative A. Alternative B would implement BMPs and RDFs as outlined in **Appendices C, D, and E** in order to further protect GRSG habitat, as well as implement a 3 percent disturbance cap, which would result in healthier soil resources.

Fluid Mineral Leasing

Under Alternative B, 3,845,517 acres (27 percent) of the planning area would be managed as open to fluid mineral leasing, 2,498,324 acres (17 percent) would be managed with CSU, 586,771 acres (4 percent) would be managed with NSO, and 7,217,528 acres (51 percent) would be managed as closed to fluid mineral leasing. Under Alternative B, conservation measures in addition to RDFs would be applied as COAs to the existing federal leases in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, design requirements, and reclamation standards. This, in addition to the 3 percent surface disturbance cap, would result in lower impacts on soil resources than Alternative A.

4.17.6 Alternative C***Impacts from Wild Horse and Burro Management***

Alternative C would manage wild horses and burros similarly to Alternative A, except that under Alternative C, water developments are proposed for removal. This would modify the distribution of wild horses and burros on the landscape and may result in intensified use of riparian areas year around, which would increase trampling, vegetation removal, and soil compaction in these areas.

Impacts from Livestock Grazing and Range Management

Alternative C would close all acres to livestock grazing and would remove all allotments from the planning area. This would include any allotments completely or partially within occupied GRSG habitat. This would eliminate the possibility of the short-term, site-specific impacts from livestock grazing and the associated impacts on soil resources, including vegetation removal, and soil trampling or compaction. Alternative C would be the most protective of soil resources from impacts related to livestock grazing compared with all others.

Impacts from Travel Management

Under Alternative C, 1,202,694 acres (9 percent of the planning area) would be managed as open to cross-country motorized travel, 300,328 acres (3 percent) would be managed as closed to cross-country motorized travel, and 10,937,171 acres (87 percent) would be managed as limited to existing roads and trails.

Alternative C would managed the same amount of acreages as closed to cross-country motorized travel as Alternative A, would manage 5,609,196 fewer acres as open to travel management than Alternative A, and 5,611,794 more acres as limited to existing roads and trails. This equates to a 45 percent reduction in lands open to cross-country motorized travel and managed as limited to existing roads and trails, which would be more protective of soil resources from the potential effects of cross-country motorized travel than Alternative A or B.

Impacts from Lands and Realty Management

Alternative C would manage 10,682,124 acres (85 percent) as ROW exclusion, 292,671 acres (2 percent) as ROW avoidance, and 1,643,233 acres (13 percent) as open to ROW authorizations. This includes managing 4,547,043 acres of PHMA and 5,669,422 acres of GHMA as ROW exclusion areas. Compared with the other Alternatives, Alternative C would be more protective of soil resources from potential impacts from ROW authorizations due to a greater amount of acreage designated as ROW exclusion areas, which is the most restrictive ROW designation.

Alternative C would increase the acreage managed as ROW exclusion areas by 9,824,560 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,014 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,546 acres (52 percent) compared with Alternative A. ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization which reduces the amount of vegetation clearing and soil compaction occurring within a ROW authorization. Regardless of ROW designation, any authorized ROW effects on soil resources would be limited to the footprint of the disturbance area within the ROW. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Impacts from Mineral and Energy Development

Alternative C has the most acres closed to mineral exploration and development and is the most restrictive of mineral exploration and development of all the alternatives. However, a 3 percent disturbance cap would not apply to all human activity in GRSG habitat, including energy and mineral development where this land is open to such uses within GRSG habitat. As such, due to the number of acres closed, Alternative C would provide the most protection for soil resources from disturbance from mineral exploration and development, as described in **Section 4.17.2**.

Locatable Minerals

Availability for locatable mineral entry would be withdrawn on 1,435,941 acres (10 percent) of the planning area and would be open for exploration or development on 2,724,488 acres (19 percent). All occupied habitat, 9,987,864 acres (70 percent) would be recommended for withdrawal, which would protect soil resources from potential effects of locatable mineral development in these areas once the petition is complete. Approved mineral entry would require RDFs (to the extent consistent w/ applicable law) as outlined in **Appendix C**. Alternative C would decrease the acreage open to locatable mineral entry by 9,963,422 acres from Alternative A. Alternative C would prevent the most potential soil impacts from locatable mineral management of all the alternatives.

Mineral Materials

Alternative C would manage 11,753,430 acres (83 percent) as closed to mineral material disposal and 2,394,826 acres (17 percent) as open to mineral material disposal. This is a reduction in acres open to mineral material disposal of 8,141,684 from Alternative A. Other than the increase in acres closed to mineral material disposal, management under Alternative C would be the same as Alternative B. Alternative C would prevent the most potential soil impacts from mineral material disposal of all the alternatives.

Nonenergy Leasable Minerals

Nonenergy solid leasables would be managed as closed to mineral exploration and development on 11,699,429 acres (83 percent) and open to mineral entry exploration and development on 2,446,636 acres (17 percent). This is an 8,625,862-acre increase in areas closed to nonenergy solid leasable exploration and development from Alternative A. Alternative C would prevent the most potential soil impacts from nonenergy solid leasables of all the alternatives.

Fluid Mineral Leasables

Under Alternative C, 1,469,897 acres (10 percent) of the planning area would be managed as open, 790,987 acres (6 percent) would be managed with CSU, 187,826 acres (1 percent) would be managed with NSO, and 11,699,429 acres (82 percent) would be managed as closed. No acres in PHMA and GHMA would be open to fluid mineral leasing. Alternative C would prevent the most potential soil impacts from fluid mineral leasing of all the alternatives.

4.17.7 Alternative D***Impacts from Wild Horse and Burro Management***

Alternative D would evaluate HMAs in PHMA based on HAF indicators or with values adjusted for regional conditions. It may modify AMLs, based on rangeland health analysis and monitoring data, if GRSG habitat objectives were not being met. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition, which would result in healthier soils due to appropriate vegetation composition and cover. This would reduce cases of soil compaction or erosion.

Impacts from Livestock Grazing and Range Management

Under Alternative D, 12,183,315 acres or 97 percent of the planning area would be managed as open to livestock grazing and 335,588 acres or 3 percent of the planning area would be managed as closed to livestock grazing. Of the acres open to livestock grazing, 4,408,539 acres (29 percent) are located within PHMA and 5,514,479 acres (44 percent) are located within GHMA. This is a 62,260 acre reduction in acres open to livestock grazing within PHMA, and a 3,152 acre reduction in acres open to livestock grazing within GHMA in comparison with Alternative A. Of the 335,588 acres closed to livestock grazing, 269,823 acres are located within PHMA or GHMA, and the remaining acres were either already closed to livestock grazing under existing management, or

are priority RNAs which would be closed regardless of meeting land health standards. Alternative D would be slightly more protective of soil resources from the potential effects of livestock grazing than Alternative A due to the reduction of acres open to livestock grazing in PHMA and GHMA.

Impacts from Travel Management

Alternative D would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B, and would therefore have similar effects on soil resources as Alternative B. However, Alternative D would provide fewer restrictions on route construction and maintenance, which may lead to more dispersed construction and therefore more dispersed impacts on soil resources.

Alternative D would managed the same amount of acreage as closed to cross-country motorized travel as Alternative A, would managed 2,670,351 fewer acres as open to travel management than Alternative A which equates to a 21 percent reduction in lands open to cross-country motorized travel. This would be more protective of soil resources from the potential effects of cross-country motorized travel than Alternative A.

Impacts from Lands and Realty Management

Alternative D would manage 857,564 acres (6 percent) as ROW exclusion areas and 5,965,000 (47 percent) acres as ROW avoidance areas. This includes managing 257,154 acres of PHMA and 288,195 acres of GHMA as ROW exclusion areas and managing 4,289,889 acres of PHMA and 1,672,025 acres of GHMA as ROW avoidance areas. ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,129 acres. Overall effects of lands and realty management would be very similar to Alternative A as an increase in ROW avoidance areas does not restrict ROW authorizations. However, Alternative D would implement a 3 percent disturbance cap on human disturbances, which includes ROW authorizations, and includes ROW avoidance and open ROW areas. Exceptions could be made for some development, so disturbance from ROW development could still affect soil resources.

Impacts from Mineral and Energy Development

Under Alternative D, mineral and energy development management would be similar to that described under Alternative B, including the 3 percent disturbance cap.

Locatable Minerals

Acres withdrawn from, open to and recommended for withdrawal from locatable mineral entry under Alternative D are the same as under Alternative A. Alternative D would require proponents of approved mineral entry to consider implementing BMPs and RDFs through the NEPA process if the project were located in PHMA or GHMA.

Mineral Material Disposal

Mineral material disposal management under Alternative D would be the same as Alternative B.

Nonenergy Leasable Minerals

Alternative D would close 3,497,102 acres (24 percent) to nonenergy leasables and would manage 10,648,963 acres (75 percent) as open to nonenergy leasables. Nonenergy leasables would be subject to NSO stipulations in PHMA. Underground development options with entry locations outside of PHMA and GHMA would be considered to disrupt less GRSG habitat. BMPs and RDFs would be applied to existing leases. Alternative D would provide for more protection from the potential effects on soil resources from mineral development than Alternative A due to NSO restrictions.

Fluid Mineral Leasing

Under Alternative D, 1,469,897 acres (10 percent) of the planning area would be managed as open, 5,361,356 acres (37 percent) would be managed with CSU, 3,549,784 acres (25 percent) would be managed with NSO, and 3,497,102 acres (24 percent) would be managed as closed. Under Alternative D, the BLM would apply a buffer system to manage fluid mineral development in GRSG habitat. Under this system, leks would be surrounded by buffers of varying sizes in which NSO stipulations would apply. In addition, CSU stipulations would apply to all areas in occupied habitat that are outside a lek buffer. The CSU stipulations would limit habitat fragmentation and, in PHMA, a 3 percent disturbance limit and 640-acre spacing requirements. Application of these surface-disturbance restrictions and other operating standards would limit the siting, design, and operations of fluid mineral development projects, which would be more protective of soil resources than Alternative A.

4.17.8 Alternative E***Impacts from Wild Horse and Burro Management***

Alternative E would be managed similarly to Alternatives A and C. The HMAs would be managed at a total AML of 1,340-2,655 horses and burros, which is similar to current management. Wild horse roundups would be prioritized in GRSG areas that are over AML, and additional measures may be warranted to conserve GRSG habitat if sagebrush habitat is being impacted in HMAs.

Impacts from Livestock Grazing and Range Management

Alternative E would have the same amount of acreage open and closed to livestock grazing as Alternative A. Alternative E would also manage the same amount of acreage of GRSG Core Area habitat as open or closed to livestock grazing as Alternative A. Alternative E would manage 3,826,015 acres (30 percent) as open to livestock grazing in Low Density habitat compared with 5,511,327 acres (44 percent) under Alternative A. Effects of livestock grazing on soil resources under Alternative E would be the similar to those expected

under Alternative A, with a slight reduction in potential impacts in Low Density habitat due to the 14 percent change of closure to livestock grazing.

Impacts from Travel Management

Alternative E would manage 3,913,675 acres (31 percent) of the planning area as open to cross-country motorized travel, 275,965 acres (2 percent) as closed to cross-country motorized travel, and 6,043,851 acres (48 percent) as limited to existing road and trails. This would be a 2,898,215 acre or 23 percent reduction in acres open to cross-country travel, a 25,363 acre or 0.2 reduction in acres closed to cross-country travel, and a 720,344 acre or 6 percent increase in acres managed as limited to existing roads and trails. Due to the reduction in acres open to cross country travel, and slight increased use of roads and trails, Alternative E would be more protective of soil resources than Alternative A, due to less acreage open and available for soil compaction caused by overland travel. Alternative E would also seasonally restrict OHV use to areas greater than 2 miles from leks during the GRSG breeding season (approximately March 1 through July 15), which would reduce the potential for effects on soil resources from overland travel during this seasonally wet time.

Impacts from Lands and Realty Management

Under Alternative E, 4,866,030 acres (39 percent) would be managed as ROW exclusion and 1,821,721 acres (14 percent) would be managed as ROW avoidance. Of these acres, 4,547,043 of ROW exclusion area would be in core area habitat and 156,523 acres of exclusion area would be in low density habitat. Additionally 1,384,208 of ROW avoidance acres would be in low density habitat.

Alternative E would manage the same number of acres as ROW exclusion as Alternative B, which is more than A and D and less than C and F. However, Alternative E would manage fewer acres as ROW avoidance than Alternatives A, B, or D. In conclusion, Alternative E would be less protective of soil resources than Alternatives C and F due to their greater acreage of exclusion areas, and less protective than Alternative B due to its equal amount of exclusion areas and higher amounts of avoidance area. While Alternative E would manage fewer acres as ROW avoidance than Alternative A, it would exclude ROW development on more acres, which would be more protective of soil resources.

Impacts from Energy and Mineral Development

Management of energy and mineral development under Alternative E would be similar to Alternative B. Alternative E would not manage mineral exploration and development within a 3 percent disturbance cap.

Locatable Minerals

Locatable mineral management under Alternative E would be the same as under Alternative B, except that additional BMPs and RDFs would not be required on nonhabitat.

Mineral Materials

Alternative E would manage mineral material disposal the same as Alternative B.

Nonenergy Leasable Minerals

Alternative E would manage nonenergy leasables the same as Alternative B.

Fluid Mineral Leasing

Under Alternative E, fluid mineral leasing would be managed the same as under Alternative B.

4.17.9 Alternative F***Impacts from Wild Horse and Burro Management***

Management of wild horse and burro under Alternative F would be the same as Alternative B, except that there would be a reduction in wild horse AML of 25 percent for HMAs that contain PHMA and GHMA. This would reduce grazing pressure on the vegetation in these areas, which could locally improve soil health from the impacts described under **Section 4.17.2**.

Impacts from Livestock Grazing and Range Management

Under Alternative F 7,506,632 acres, or 59 percent, of the planning area would be managed as open to livestock grazing; 2,502,210 acres, or 19 percent, of the planning area would be managed as closed to livestock grazing. Alternative F would result in a 4,751,705 acreage reduction, or a 37 percent decrease in lands open to grazing over Alternative A. Of the acres closed to livestock grazing, 1,118,081 acres are located in PHMA and 1,384,129 acres are located in GHMA. Alternative F is the second most restrictive alternative for livestock grazing, removing approximately 56 percent of the area from grazing. This alternative would therefore be the second most protective of soil resources from potential short-term effects on vegetation and long-term effects on biological crusts due to livestock grazing behind Alternative C.

Impacts from Travel Management

Alternative F would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B thus be equally protective of soil resources and more protective than Alternative A. Additionally, Alternative F would prohibit road construction and upgrades within 4 miles of active leks, and would avoid road construction and upgrades within occupied habitat. This would further limit the potential effects of travel management on soils, as described under **Section 4.17.2**.

Impacts from Lands and Realty Management

Alternative F would have the same potential for impacts on soil resources as Alternative C and would manage the same acreage as ROW exclusion (10,682,124 acres) and ROW avoidance (292,671 acres) areas.

Impacts from Energy and Mineral Development

Management of energy and mineral development under Alternative F would be similar to Alternatives B and E for locatable minerals and similar to Alternatives B and D for salable or disposal mineral materials. In addition, a 3 percent surface disturbance cap would be applied under this alternative, including disturbance from fire. Because fire would be included in the disturbance cap under Alternative F, the 3 percent cap is more likely to be reached sooner, resulting in limitations to additional disturbance, thus it would be more protective of soil resources than Alternatives A or C.

Locatable Minerals

Locatable mineral management under Alternative F would be the same as under Alternative B and E.

Mineral Materials

Alternative F would manage mineral material disposal the same as Alternative B and E.

Nonenergy Leasable Minerals

Alternative F would manage nonenergy leasables the same as Alternative B.

Fluid Minerals

Alternative F would manage fluid mineral leasables the same as Alternative C.

4.17.10 Proposed Plan***Impacts from Wild Horse and Burro Management***

Management of wild horses and burros under the Proposed Plan would be similar to Alternative B. The Proposed Plan would use HMAPs to incorporate GRSG habitat objectives, and would adjust AMLs through the NEPA process in SFA and PHMA. This would be in cases where wild horses and burros are identified as a significant factor in not meeting land health standards. These additional parameters for HMAs would reduce negative impacts on the rangeland and reduce grazing pressure, which would improve soil conditions and quantity of biological soil crusts.

Impacts from Livestock Grazing and Range Management

The Proposed Plan would be similar to Alternative B. Livestock grazing management would emphasize the SRH parameters. Grazing permits, leases, and AMPs would be adjusted before the start of the next grazing season if the allotment is not meeting SRH. If SRH is being met, then no changes would be made to current management or activity plans. The Proposed Plan would manage 12,232,499 acres as open to livestock grazing, which is approximately 25,838 acres more than Alternative A. Of the acres open to livestock grazing, 4,447,931 (36 percent) are in PHMA and 5,478,656 (44 percent) area in GHMA. The Proposed Plan would manage 279,342 acres as closed to livestock grazing, which is 25,838 more acres than Alternative A. Of the closed acres, 70,469 are

in PHMA and 125,006 are in GHMA. All or portions of key RNAs would be unavailable to grazing, and fences, corrals, and water storage facilities would be considered for removal in closed areas. The potential impacts on soil resources from livestock grazing would be essentially the same under the Proposed Plan as under Alternative A.

Impacts from Travel Management

The Proposed Plan would manage 1,202,682 acres as open to cross-country motorized travel, 367,000 acres as closed to cross-country travel, and 11,043,240 acres as limited to existing routes, which is most similar to Alternative C. Additionally, the Proposed Plan would exclude new road construction and upgrades within 4 miles of active leks, except for public safety, administrative use, and valid existing rights. It would avoid new road construction and upgrades in occupied habitat, which would further limit the potential effects of travel management on soil resources, as described under **Section 4.17.2**. The reduction in lands open to cross-country motorized travel and managed as limited to existing roads and trails would provide greater protection of soil resources from the potential effects of cross-country motorized travel than Alternative A.

Impacts from Lands and Realty Management

The Proposed Plan would manage ROW permitting, with 858,203 acres (6 percent) managed as exclusion areas and 9,914,490 acres (78 percent) as avoidance areas. The Proposed Plan would manage a similar number of acres as ROW avoidance as Alternative A, but it would manage 6,468,805 more acres as avoidance areas. Of the acres managed as ROW exclusion, 265,403 would be in PHMA and 286,733 would be in GHMA. Of the acres managed as ROW avoidance, 4,229,620 would be in PHMA and 5,250,480 would be in GHMA.

The Proposed Plan would be more protective of soil resources than Alternative A due to a near doubling of ROW avoidance areas, but it would be less protective than Alternatives B, C, E, and F due to less acreage of ROW exclusion areas. Additionally, the Proposed Plan would have a 3 percent disturbance cap on human disturbances, which is applicable to ROW authorizations. Once this cap is reached, the Proposed Plan would result in greater protection of soil resources from disturbance associated with ROW authorizations than Alternatives A, C, and E.

Impacts from Energy and Mineral Development

The Proposed Plan would be more protective of soil resources (including biological crusts) from vegetation clearing, soil compaction, and soil excavation than Alternative A due to more restriction on energy and mineral development. (Specific acreage differences under the various mineral resources are detailed below.) The Proposed Plan would manage energy and mineral development with a 3 percent disturbance cap, which would result in more protection for soil resources than Alternatives A, C, and E, once the cap is reached.

Locatable Minerals

The Proposed Plan would manage 1,435,911 acres (10 percent) as withdrawn from locatable mineral entry and would propose an additional 1,835,762 (13 percent) for withdrawal. The remaining 10,876,592 (77 percent) would be managed as open to locatable mineral entry. This is more restrictive than Alternatives A and D, and less than Alternatives B, C, E, and F.

Mineral Materials

The Proposed Plan would manage 7,343,283 acres (52 percent) as closed to mineral material disposal and 6,804,973 acres (48 percent) as open to mineral material disposal. This is a 3,731,537-acre reduction from Alternative A. This would be less restrictive than Alternative C and similar to Alternatives B, D, E, and F.

Nonenergy Leasable Minerals

The Proposed Plan would manage nonenergy leasables the same as Alternative B, E, and F.

Fluid Minerals

Under the Proposed Plan, 1,469,912 acres (10 percent) of the planning area would be managed as open, 4,847,381 acres (34 percent) would be managed with CSU, 4,333,744 acres (31 percent) would be managed with NSO, and 3,497,102 acres (25 percent) would be managed as closed. This is less restrictive than Alternatives B, C, E, and F.

4.18 WATER RESOURCES

4.18.1 Methods and Assumptions

Indicators

Indicators of impacts on water resources are as follows:

- Alter land open or closed to surface disturbing-activities
- Alter the characteristics of water sources that influence GRSG to a point where these resources are not properly functioning or sustainable
- Provide or restore water sources for GRSG
- Alter water resources for reduced mosquito-breeding habitat
- Alter the condition of riparian and wetland vegetation (increase or decrease either extent or species type)

Assumptions

The analysis includes the following assumptions:

- Projects that help restore watersheds, desirable vegetation communities, or wildlife habitats (including surface disturbance associated with these efforts) would benefit water resources over the long term.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors. These are proximity to running streams, drainages and groundwater wells, location within the watershed, time and degree of disturbance, reclamation potential of the affected area, vegetation present, precipitation, and mitigating actions applied to the disturbance.
- Surface-disturbing actions related to fluid mineral development would comply with Gold Book surface operating standards (and subsequent updates), and all federal and state water quality standards.
- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer. The BLM can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease or does not affect lease rights.

4.18.2 Nature and Type of Effects

Surface water quality is influenced by both natural and human factors. Natural factors include weather-related erosion or soil delivery into waterways as the result of wildfire removal of vegetation. Human related factors that can temporarily affect surface water quality includes additional transport of eroded soils into streams due to improper recreational activities or unmanaged livestock grazing. Water quality can be affected by introduction of waste matter into streams from domestic livestock or congregating horse herds, and soil from low-water crossing points of roads, routes, and ways used by motorized vehicles. Activities that introduce chemicals into the natural environment also have the potential to degrade surface and water quality through chemical leaks, accidents, or broken well casings. All of these activities have appropriate regulation and mitigation measures in place to reduce and, in most cases, eliminate these risks.

Surface-disturbing activities under certain circumstances can also lead to soil compaction, which decreases infiltration rates and elevates the potential for overland flow. Overland flow can increase erosion and sediment delivery potential to area surface water bodies, leading to surface water quality degradation.

Surface-disturbing activities within stream channels, floodplains, and riparian habitats are more likely to alter natural morphologic stability and floodplain function. Morphologic destabilization and loss of floodplain function accelerate stream channel and bank erosion, increase sediment supply, dewater near-stream alluvium, cause the loss of riparian and fish habitat, and deteriorate water quality (Rosgen 1996). Altering or removing riparian habitats can reduce the hydraulic roughness of the bank and increase flow velocities near the bank, which can also lead to accelerated erosion and possibly decrease water quality (National Research Council 2002).

Removing riparian vegetation and the shade it provides contributes to elevated stream temperatures (Rishel et al. 1982; Beschta 1997). Channel widening or lowering overall flow can similarly increase solar loading. The principal source of heat energy delivered to the water column is solar energy striking the stream surface directly (Brown 1969). Exposure to solar radiation can increase stream temperature. The ability of riparian vegetation to shade the stream throughout the day depends on aspect and vegetation height, width, density, and positions relative to the stream, as well as aspect the stream flows (streamside vegetation provides less shade on a north- or south-flowing stream than on an east- or west-flowing stream).

There are natural and human-induced causes of stream degradation due to removal of riparian vegetation and destabilization of streambanks across the planning area. Bank erosion from high water volume and velocity during intense rainstorms can alter the bed and banks. The land uses most commonly associated with stream degradation in the planning area is unmanaged livestock grazing and excessive use by wild horses and burros because it is most prevalent, compared with other disturbance factors. Other land uses associated with degraded streams are road location, construction and use, trails, water withdrawal, mining, reservoir storage and release, altered physical characteristics of the stream, and wetlands alteration.

Management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that disturb the surface. Therefore, the greater the amount of acreage restricted from a land disturbing use, the greater the protection of impacts from surface disturbing activities afforded to water resources.

Lands and realty management decisions effect where ground-disturbing activities can and cannot occur. The use of ROW exclusion and ROW avoidance designations limit the amount of human-made runoff of soils and chemicals into waterways within those areas and are generally considered to be protective of water quality. ROW exclusion and avoidance are also seen as a means to reduce the likelihood of chemical spills onto the ground which may contaminate surface or groundwater. Areas where ROWs are authorized are permitted with conditions of approval (COAs) which assure that the holder of the rights

comply with the Water Quality Act and other federal and state laws, which would protect water resources from degradation.

In areas with NSO stipulations and managed as ROW exclusion, the potential for effects on water quality would be reduced since new ground disturbances would be prohibited. In areas managed as ROW avoidance, water quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on water quality, compared with areas not managed as ROW avoidance.

Livestock, wild horses, and burros often use the same riparian and wetland areas for water and shade and may congregate around water developments. This can result in compacted soil, decreased water quality due to fecal coliform introductions, trampled and consumed nearby vegetation, and reduced riparian community conditions and hydrologic functionality.

Unmanaged livestock grazing and wild horse and burro populations above AMLs can lead to loss of vegetation cover, reduced water infiltration rates and nutrient cycling, decreased plant litter and lower water quality, and increased bare ground and soil erosion (Manier et al. 2013). Livestock grazing can be a compatible use in riparian areas when managed in harmony with land management objectives. Regardless of other differences in management objectives, grazing must be compatible with achieving or maintaining PFC to be considered sustainable (USDI 1997).

Land health evaluations, appropriate animal management levels, rangeland monitoring studies, and rangeland health standards are used to assess rangeland condition and help to identify where a change in livestock grazing or wild horse and burro management would be beneficial. Additionally, drought management objectives are also available on top of livestock and wild horse and burro management during drought years to respond to specific environmental needs. These objectives are maintaining the water quality of lower water levels in ponds, lakes, and streams and assessing instream flows for water management and use (State of Oregon EOP 2002).

At the same time, water supply structures throughout the landscape that have been established for the benefit of livestock and wild horses and burros may also provide drinking water sources for GRSG. GRSG will use free water although they do not require it because they obtain their water needs from the food they eat. Information on the extent of habitat influenced by produced water and the net effects on GRSG populations is unknown (USFWS 2010a). Natural water bodies and reservoirs can provide mesic areas for succulent forb and insect production, thereby attracting GRSG hens with broods (Connelly et al. 2004). It is unknown whether wildlife guzzlers built to supply free water in normally arid habitats provide a net benefit to GRSG or if potential benefits are countered by potential negative consequences. These negative consequences may include increased competition from other species that benefit from

guzzlers, such as domestic and wild ungulates, or predators and the associated increase in predation risk (Braun 1998). In addition, new water resources may become additional habitat for mosquitoes carrying West Nile virus (Naugle 2004).

Diverting the water sources has the secondary effect of changing the habitat at the water source before diversion. This could result in the loss of either riparian or wet meadow habitat important to GRS as sources of forbs or insects. Further study is needed to determine the effects of water management on the sagebrush biome.

Travel across land, especially by motorized or mechanized travel, can result in vegetation loss, loss of biotic crusts, soil compaction, and soil erosion, which may increase soil deposition into waterways. Management approaches that designate travel to specified routes can result in more predictable, localized, and manageable impacts. Selectively locating travel routes away from areas where water resources exist can minimize the extent of these effects.

Recreation on BLM-administered lands may result in temporary and localized increased soil deposition into waterways, and temporary decreases in water quality from recreational uses such as OHV use, camping and river floating. There are a number of activities that have minimal impacts. The effects of recreation on water resources are determined by the proximity of the recreation to waterways, and the severity and intensity of the recreation taking place. Areas with large number of visitors or the use of OHVs have a greater chance of resulting in some of the detrimental effects than lower impact, lower visitor number recreation areas.

Potential impacts from locatable mineral, mineral material disposal, nonenergy leasable, and fluid leasable mineral activity may result from violation of mineral regulations. The violations can include the release of pollutants capable of contaminating surface water or aquifers during groundwater recharge as a result of use, storage, and transportation of hazardous fluids and compounds. Mining activities and developments could alter drainage patterns which would affect stream flow and water supplies, and unintended discharge of mine water could alter water chemistry and impair natural stream morphologic conditions. Effects or impacts from mineral activity is regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval which have effectively reduced the potential of surface or groundwater contamination. However, areas managed as closed to mineral entry would eliminate any potential for impacts on water resources, and therefore be more protective of water resources than areas open to mineral entry.

Implementing management for the following resources would have negligible impact or no impact on water resources for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Coal
- Recreation management
- Special designations
- Air quality and climate change
- Special status plants

4.18.3 Impacts Common to All Alternatives

Impacts from Vegetation Management

Under all alternatives, habitat restoration would occur. It would be implemented based on environmental variables that indicate areas most likely to succeed in restoration and therefore benefit GRSG. Restoring habitat has a beneficial effect on water quality over the long term. Direct effects of vegetation management are not expected to occur unless the required design features or BMPs fail. Then there may be a temporary decrease in water quality through increased sedimentation into waterways from vegetation clearing or burning. However, vegetation management would be designed and implemented so that sediment delivery into waterways is minimized. Long-term effects of vegetation management would protect water quality by maintaining infiltration rates, thereby reducing runoff and sediment delivery into surface waters by way of stabilizing soils with vegetation.

Vegetation management would also aim to reduce and prevent the spread of invasive plants under all alternatives. Displacement of native plants by invasive plants results in changes in the soil properties such as soil water availability. This change may result in bare ground or the inability to support the ecological site, which may affect water resources by increasing sediment deposition into waterways and decreasing overall water availability.

Impacts from Leasable Minerals Management

While there is potential for development, there have been no wells developed on these leases issued on occupied GRSG habitat in the planning area. Under all alternatives, the potential for development is estimated to be low; therefore, impacts on water resources from development as described in **Section 4.18.2** would be extremely limited. The differences in potential management effects on water resources from leasable minerals management under each alternative are the amount of acreage that would be closed to leasing. The greater the amount of land closed to leasing, the more protective of water resources the alternative is due to eliminating potential for impact.

Impacts from Locatable Minerals Management and Mineral Materials

All locatable minerals and mineral materials have potential to exist within the planning area, but exploration efforts have been minimal and the potential is unknown across all alternatives. The differences in potential management effects on water resources from locatable mineral entry and mineral material disposal

under each alternative are the amount of acreage that would be recommended for withdrawal or closed from mineral entry. The greater the amount of land withdrawn from locatable mineral entry, the more protective of water resources the alternative is due to eliminating potential for impacts as described in **Section 4.18.2**.

Impacts from Nonenergy Leasable Minerals Management

As mineral potential reports are not completed, and there is currently no commercial interest in solid leasables, the potential for nonenergy leasable minerals is unknown. Impacts on water resources are likely to be minimal across all alternatives. The differences in potential management effects on water resources from nonenergy leasable minerals management under each alternative are the amount of acreage that would be closed to leasing. The greater the amount of land closed to leasing, the more protective of water resources the alternative is due to eliminating potential for impacts as described in **Section 4.18.2**.

Impacts from Mineral Split-Estate Management

For the purposes of impacts on water resources, split-estate minerals would be similar to that described above by category of minerals.

Impacts from Wildland Fire Management

Effects of fire on water resources are determined largely by the location for the fire, the severity of the fire, any decisions made relative to any suppression activities, and the immediate post-fire precipitation regime. Highly variable effects of fire on water resources can occur under all alternatives. This results in a wide range of short term decreases in water quality due to increase particulate loads, increased streamflow and average storm flow discharge as a result of lower vegetation density and reduction in litter cover (Forest Service 2005).

4.18.4 Alternative A

Impacts from Wild Horses and Burros

Alternative A would continue to manage HMAs at the current AML and would evaluate AMLs based on existing management. Alternative A would continue to manage water resources and range improvements in the current manner, which would continue to support the current disbursement of wild horses and burros on the landscape.

Impacts from Livestock Grazing and Range Management

Under Alternative A, 12,58,337 acres, or 98 percent of the planning area is open to livestock grazing; 253,504 acres or 2 percent of the planning area is closed to livestock grazing. Of the acres open to livestock grazing 4,470,799 acres (36 percent) are within PPH and 5,511,327 acres (44 percent) are within PGH on BLM-administered lands.

All permits and leases under Alternative A would continue to be required to meet or make progress toward meeting standards defined in the Oregon and Washington Public Land Health Standards (described in **Section 3.8**, Livestock Grazing and Range Management). Grazing permits, including grazing systems, permitted AUMs, and allotment boundaries would be modified as necessary to conform to Standards and Guidelines for Livestock Grazing Management. Changes to rangeland management would be directed first to allotments not meeting land health standards, which may include changes in number of permitted AUMs, or current timing, duration or frequency of permitted use, including temporary closures.

Alternatives A, B, and E have the most acreage that would be managed as open to livestock grazing. This would subject the water resources to the greatest possible short- and long-term impacts from livestock grazing, as outlined in **Section 4.18.2**. Generally the short-term impacts are decreased water quality, due to fecal coliforms, and reduced riparian community conditions, depending on severity of vegetation removal. Longer term impacts include compacted soil, trampled or consumed nearby vegetation that exposes land surfaces to erosion or change vegetation community types, and associated changes to stream hydrologic functionality.

Due to the large planning area, the distribution of any of the impacts, either short term or long term, would be localized to individual grazing allotments or pastures and not entirely over the planning area, as would impacts from compacted areas or changes to streams that alter their hydrologic function. Based on the number of allotments that do not meet standards because of grazing factors (14 percent;), the overall impact would be considered low for any of the stated alternatives.

Impacts from Travel Management

Alternative A would manage 6,811,890 acres (54 percent) of the planning area as open to cross-country motorized travel, 300,328 acres (2 percent) of the planning area as closed to cross-country motorized travel, and 5,325,377 acres (42 percent) as limited to existing roads and trails, with possible additional seasonal or vehicle type restrictions. Alternative A would manage the largest amount of acreage as open to cross-country motorized travel, which subjects the most water body resources to the possible impacts caused by overland travel as outlined in **Section 4.18.2**. Potential effects of travel management on water resources include point source temporary degradation from stream crossings and increased soil deposition into waterways.

Impacts from Lands and Realty Management

Under Alternative A, 857,564 acres (7 percent of the planning area) would continue to be managed as ROW exclusion areas, and 3,445,685 acres (27 percent) would continue to be managed as ROW avoidance areas. Alternative A

would manage 8,314,779 acres (66 percent) of the planning area as open to potential ROW authorizations.

Within exclusion areas, new ROW development would continue to be prohibited. This would prevent surface disturbance from ROW development within these areas. Within avoidance areas, the BLM would require ROW applicants to observe additional conditions, such as location criteria and design requirements. This could discourage new ROW development in these areas. Within areas open to ROW authorization, water resources may be affected by ROW development, including potential for vegetation loss, soil compaction and erosion. However, any effects on water resources from ROW authorizations would be limited to the footprint of the disturbance area within the ROW, and any access roads necessary to get to the ROW development location, which varies with each authorization. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

4.18.5 Alternative B

Impacts from Wild Horse and Burro Management

Alternative B would amend HMAPs to incorporate GRSG habitat objectives and would prioritize the evaluation of all AMLs based on indicators that address the structure, condition, and composition of vegetation and measurements specific to achieving GRSG habitat objectives. GRSG habitat objectives are conservation based, and aimed at improving vegetation composition and riparian areas, which would reduce cases of soil erosion and sediment delivery into streams.

Impacts from Livestock Grazing and Range Management

Under Alternative B, management actions would not result in direct changes to the number of acres open or closed to livestock grazing. GRSG habitat objectives and management considerations would be incorporated into all BLM grazing allotments through AMPs or permit renewals. Land health assessments would be prioritized to permits within PHMA. GRSG habitat objectives are conservation based and are aimed at improving vegetation composition and riparian areas.

Alternative B would provide for range improvements, including new water diversions from springs and seeps, only if the water developments would benefit PHMA and improve GRSG habitat. Improving water sources includes fencing around springs and seeps and moving watering areas away from the streams and springs. This would improve the distribution of livestock and water quality. By locating improvements in upland areas away from riparian areas there is less crushing and removal of vegetation and concentration of livestock, wild horses, and burros. This improves the water quality by reducing sediment and fecal color from inputs and improving riparian areas used by GRSG.

Impacts from Travel Management

Under Alternative B, 4,141,539 acres (33 percent of the BLM-administered surface lands) would be managed as open to unrestricted cross-country motorized travel, 300,328 acres (2 percent) would be managed as closed to cross-country motorized travel, and 7,996,165 acres (63 percent) would be limited to existing roads and trails. This equates to a 21 percent reduction in lands open to cross-country motorized travel, and a 21 percent increase in lands managed as limited to existing roads and trails. Thus Alternative B may reduce the open traveled areas that are more susceptible to degradation and would open more areas that would confine travel to an improved travel way. Therefore, Alternative B would be more protective of water resources from the potential effects of cross-country motorized travel (described in **Section 4.18.2**) than Alternative A.

Impacts from Lands and Realty Management

Alternative B would manage 4,866,030 acres (39 percent of the planning area) as ROW exclusion areas, 6,106,923 acres (48 percent) as ROW avoidance areas, and 1,645,075 acres (13 percent) as open to ROW authorizations. Compared with Alternative A, Alternative B would be more protective of water resources from potential impacts from ROW authorizations due to greater acreage of exclusion areas. Alternative B would increase the acreage managed as ROW exclusion areas by 4,008,466 acres or 32 percent, would increase the acreage managed as ROW avoidance areas by 2,661,238 acres or 21 percent, and would decrease the acreage open to ROW authorizations by 6,669,704 acres, or 53 percent compared with Alternative A. Additionally, Alternative B would implement a 3 percent disturbance cap on all human activity in GRSG habitat, including ROW leasing, which would limit ROW leasing in the open areas within habitat.

ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization which reduces the amount of vegetation clearing, soil compaction, and potential for increased erosion into waterways occurring within a ROW authorization. Regardless of ROW designation, any authorized ROW effects on water resources would be limited to the footprint of the disturbance area within the ROW, and any access roads necessary to get to the ROW development location, which varies with each authorization. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

Alternative B would also remove power lines and would reclaim ROW sites that are no longer in use. This would restore the surrounding habitat and would reduce the compacted surfaces that could be a potential source for soil erosion and runoff into water ways from traffic using these areas.

4.18.6 Alternative C

Impacts from Wild Horse and Burro Management

Alternative C would manage wild horses and burros similarly to Alternative A. However under Alternative C, water developments are proposed for removal, which would modify the distribution of wild horses and burros on the landscape and may result in intensified use of riparian areas year-round. This may result in increased fecal coliforms in the water, trampling and vegetation removal, and soil compaction in these areas, which may contribute to the warming of and sediment delivery to the adjacent stream water.

Impacts from Livestock Grazing and Range Management

Alternative C would close all acres to livestock grazing and would remove all allotments from the planning area. This would include any allotments completely or partially within occupied GRSG habitat. This would eliminate the possibility of the short-term, site-specific impacts from livestock grazing.

Impacts from Travel Management

Under Alternative C, 1,202,694 acres (9 percent of the planning area) would be managed as open to cross-country motorized travel, 300,328 acres (3 percent) would be managed as closed to cross-country motorized travel, and 10,937,171 acres (87 percent) would be managed as limited to existing roads and trails.

Alternative C would manage the same amount of acreages as closed to cross-country motorized travel as Alternative A, 5,609,196 fewer acres as open to travel management than Alternative A, and 5,611,794 more acres as limited to existing roads and trails. This equates to a 45 percent reduction in lands open to cross-country motorized travel, and a 45 percent increase in lands managed as limited to existing roads and trails, which would be more protective of water resources from the potential effects of cross-country motorized travel than Alternative A, and a near doubling of the level of protection compared with Alternative B.

Impacts from Lands and Realty Management

Alternative C would manage 10,682,124 acres as ROW exclusion areas (85 percent of the planning area), 292,671 acres (2 percent) as ROW avoidance areas, and 1,643,233 acres (13 percent) as open to ROW authorizations. Compared with the other Alternatives, Alternative C would be more protective of water resources from potential impacts from ROW authorizations due to a greater amount of acreage designated as ROW exclusion areas which is the most restrictive ROW designation.

Alternative C would increase the acreage managed as ROW exclusion areas by 9,824,560 acres (78 percent), but would decrease the acreage managed as ROW avoidance areas by 3,153,014 acres (25 percent), and would decrease the acreage open to ROW authorizations by 6,671,546 acres (52 percent)

compared with Alternative A. ROW avoidance and exclusion designations have more restrictive conditions of use than areas open to ROW authorization which reduces the potential of human-made runoff of soils and chemicals into waterways within those areas. Regardless of ROW designation, any authorized ROW effects on water resources would be limited to the footprint of the disturbance area within the ROW, and any access roads necessary to get to the ROW development location, which varies with each authorization. The BLM would analyze impacts from individual ROW authorizations upon receipt of applications and as part of subsequent implementation-level environmental analyses.

4.18.7 Alternative D

Impacts from Wild Horse and Burro Management

Alternative D would evaluate HMAs in PHMA, based on HAF indicators or with values adjusted for regional conditions. It could modify AMLs based on rangeland health analysis and monitoring data if GRS habitat objectives were not being met. GRS habitat objectives are conservation based and are aimed at improving vegetation composition, which would reduce cases of soil erosion and runoff into streams and improve riparian areas.

Impacts from Livestock Grazing and Range Management

Under Alternative D, 12,183,315 acres, or 97 percent, of the planning area would be managed as open to livestock grazing, and 335,588 acres, or 3 percent of the planning area, would be managed as closed to livestock grazing. Of the acres open to livestock grazing, 4,408,539 acres (29 percent) are in PHMA and 5,514,479 acres (44 percent) are in GHMA. Compared with Alternative A, this is a 62,260-acre reduction in acres open to livestock grazing in PHMA and a 3,152-acre reduction in acres open to livestock grazing in GHMA.

Of the 335,588 acres closed to livestock grazing, 269,823 are in PHMA or GHMA, and the remaining acres were either already closed to livestock grazing under existing management or are priority RNAs that would be closed regardless of meeting land health standards.

Alternative D would essentially provide the same level of protection for the water resources from the potential effects of livestock grazing than Alternative A. There is approximately a 1 percent reduction of acres open to livestock grazing in key RNAs that contain PHMA. Under Alternative D, new and existing range improvements would be authorized to enhance the functionality of seeps and springs for wildlife in PHMA and GHMA. BMPs would be used to manage for mosquito control by reducing their breeding habitat.

Impacts from Travel Management

Alternative D would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B, and would therefore have similar effects on water resources as Alternative B. However, Alternative

D would provide fewer restrictions on route construction and maintenance, which may lead to more dispersed construction and therefore more dispersed impacts on water resources.

Impacts from Lands and Realty Management

Alternative D would manage 857,564 acres as ROW exclusion areas and 5,964,814 acres as ROW avoidance areas. ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,129 acres. Overall effects of lands and realty management would be very similar to Alternative A as an increase in ROW avoidance areas does not restrict ROW authorizations. Exceptions could be made for some development, so disturbance from ROW development could still affect water resources.

4.18.8 Alternative E

Impacts from Wild Horse and Burro Management

Alternative E would be managed similarly to Alternatives A and C. The HMAs would be managed at a total AML of 1,340-2,655 horses and burros, which is similar to current management. Wild horse roundups would be prioritized in GRSG areas that are over AML, and additional measures may be warranted to conserve GRSG habitat if sagebrush habitat were being impacted in HMAs.

Impacts from Livestock Grazing and Range Management

Alternative E would have the same amount of acreage open and closed to livestock grazing as Alternative A. Alternative E would also manage the same amount of acreage of Core Area habitat as open or closed to livestock grazing as Alternative A. Alternative E would also manage 3,826,015 acres (30 percent) as open to livestock grazing in Low Density habitat, which is a 1,685,312 acre reduction in lands open to livestock grazing compared with Alternative A. Alternative A would manage 5,511,327 acres as open to livestock grazing within PGH. Effects of livestock grazing on water resources under Alternative E would be less than those expected under Alternative A, with potential impacts reduced in Low Density habitat due to greater restrictions on livestock grazing.

Alternative E would allow for the relocation of existing or development of new water developments within GRSG habitat. These developments would be constructed or modified to maintain their free-flowing and wet meadow characteristics, which would maintain water quality and riparian area functions.

Impacts from Travel Management

Alternative E would manage 3,913,675 acres (31 percent of the planning area) as open to cross-country motorized travel, 274,965 acres (2 percent) as closed to cross-country motorized travel, and 6,043,851 acres (48 percent) as limited to existing road and trails. This would be a 2,898,215 acre or 23 percent reduction in acres open to cross-country travel, a 25,363 acre or 0.2 reduction in acres closed to cross-country travel, and a 720,344 acre or 6 percent increase in acres

managed as limited to existing roads and trails. Due to the 23 percent reduction in acres open to cross county travel, Alternative E would be more protective of water resources than Alternative A, due to less acreage open and available for soil disturbance and possible stream crossings caused by overland travel. Also, Alternative E would seasonally restrict OHV use to areas greater than 2 miles from leks during the GRSB breeding season (approximately March 1 through July 15), which would reduce the potential for effects on water resources from overland travel during this generally wet season timeframe.

Impacts from Lands and Realty Management

Under Alternative E, 4,866,030 acres (39 percent) would be managed as ROW exclusion and 1,821,721 acres (14 percent) would be managed as ROW avoidance. Of these, 4,547,043 acres of ROW exclusion area would be in core area habitat and 156,523 acres of exclusion area would be in low density habitat. Additionally 1,384,208 of ROW avoidance acres would be in low density habitat.

Alternative E would manage the same number of acres as ROW exclusion as Alternative B, which is more than Alternatives A and D and less than Alternatives C and F. However, Alternative E would manage fewer acres as ROW avoidance than Alternatives A, B, or D.

In conclusion, Alternative E would be less protective of water resources than Alternatives C and F due to their greater acreage of exclusion areas, and it would be less protective than Alternative B due to its equal amount of exclusion areas and higher amounts of avoidance area. While Alternative E would manage fewer acres as ROW avoidance than Alternative A, it would exclude ROW development on more acres, which would be more protective of water resources.

4.18.9 Alternative F

Impacts from Wild Horse and Burro Management

Management of wild horses and burros under Alternative F would be the same as Alternative B, except that there would be a reduction in wild horse AML of 25 percent for HMAs that contain PHMA and GHMA. This would reduce grazing pressure on the vegetation in these areas, which could locally improve water resources from the potential impacts, as described under **Section 4.18.2**.

Impacts from Livestock Grazing and Range Management

Under Alternative F 7,506,632 acres, or 59 percent, of the planning area would be managed as open to livestock grazing; 2,502,210 acres, or 20 percent, of the planning area would be managed as closed to livestock grazing. Alternative F would result in a 4,751,705 acreage reduction, or a 37 percent decrease in lands open to grazing over Alternative A. Alternative F is the second most restrictive alternative for livestock grazing, behind Alternative C, and would therefore be the second most protective of water resources from potential effects of

unmanaged livestock grazing. Unlike Alternative B, Alternative F would not modify existing water developments or develop new water diversion from springs or seeps within GRSG habitat. This would protect water resources from development, which may draw livestock that alter stream channels and cause bank erosion.

Impacts from Travel Management

Alternative F would manage the same number of acres as open, limited, or closed to cross-country motorized travel as Alternative B. Additionally, Alternative F would prohibit new road construction and upgrades within 4 miles of active leks. It would avoid new road construction and upgrades within occupied habitat, which would further limit the potential effects of travel management on water resources, as described under **Section 4.18.2**.

Impacts from Lands and Realty Management

Alternative F would have the same potential for impacts on water resources as Alternative C and would manage the same acreage as ROW exclusion (10,682,124 acres) and ROW avoidance (292,671 acres).

4.18.10 Proposed Plan

Impacts from Wild Horse and Burro Management

Management of wild horses and burros under the Proposed Plan would be most similar to Alternative B through its use of HMAPs to incorporate GRSG habitat objectives. This would improve vegetation composition and riparian areas, which would reduce cases of soil erosion and sediment delivery into streams.

The Proposed Plan would amend HMAPs to incorporate GRSG habitat objectives. It would prioritize the evaluation of all AMLs based on indicators that address the structure, condition, and composition of vegetation and measurements specific to achieving GRSG habitat objectives. AMLs would be adjusted through the NEPA process in SFA and PHMA when wild horses and burros are identified as a significant factor in not meeting land health standards.

Water developments or other rangeland improvements for wild horses and burros would be assessed using the NEPA process for planning and implementation, using criteria identified for domestic livestock. Removing water sources before first replacing them may reduce the distribution of wild horses and burros on the landscape. Dispersing animals across the landscape rather than concentrating them around springs and seeps would improve the water quality coming from those sources.

Impacts from Livestock Grazing and Range Management

The Proposed Plan would be similar to Alternative B. Livestock grazing management would emphasize the SRH parameters. Grazing permits, leases, and AMPs would be adjusted before the start of the next grazing season if the

allotment were not meeting SRH. If SRH were being met, then no changes would be made to current management or activity plans.

The Proposed Plan would manage 12,232,499 acres as open to livestock grazing, which is approximately 25,838 acres fewer than Alternative A. The potential impacts on water resources from livestock grazing would be essentially the same under the Proposed Action as under Alternative B. All or portions of key RNAs would be unavailable to grazing, and fences, corrals, and water storage facilities would be considered for removal. This could concentrate livestock around riparian and wetland areas, which could result in a local decrease in water quality from fecal coliforms, bank vegetation removal, and trampling.

Impacts from Travel Management

The Proposed Action would manage 1,202,682 acres as open to cross-county motorized travel, 367,108 acres as closed to cross-country travel, and 11,043,240 acres as limited to existing routes, which is most similar to Alternative C. Additionally, the Proposed Action would exclude new road construction and upgrades within 4 miles of active leks, except for public safety, administrative use, and valid existing rights. It would avoid new road construction and upgrades within occupied habitat, which would further limit the potential effects of travel management on water resources, as described under **Section 4.18.2**.

Impacts from Lands and Realty Management

The Proposed Action would manage ROW permitting, with 858,203 acres (6 percent) managed as exclusion areas and 9,914,490 acres (78 percent) as avoidance areas. The Proposed Action would manage similar acres as ROW avoidance as Alternative A but would manage 6,468,805 more acres as avoidance areas.

The Proposed Action would be more protective of water resources than Alternative A, due to a near doubling of ROW avoidance areas, but it would be less protective than Alternatives B, C, E, and F due to less acreage of ROW exclusion areas. Additionally, the Proposed Action would have a 3 percent disturbance cap on human disturbances, which is applicable to ROW authorizations. Once this cap is reached, the Proposed Action would result in greater protection of water resources from disturbance associated with ROW authorizations than Alternatives A, C, and E.

4.19 LANDS WITH WILDERNESS CHARACTERISTICS

4.19.1 Methods and Assumptions

Indicators

Indicators of impacts on lands with wilderness characteristics are protection or degradation of the inventoried characteristics to a level at which the value of the

wilderness characteristic would no longer be present within the specific area. The inventoried wilderness characteristics are as follows:

- Size of road acres—Impacts would result from building roads that would reduce the roadless size.
- Naturalness (apparent naturalness, not ecological naturalness)—Impacts would result from developments or vegetation manipulations that make the area appear less natural.
- Opportunities for solitude or primitive recreation—Impacts would result from increases in visitation or loss of recreation opportunities.
- Supplemental values—Impacts would result from any action that degrades the inventoried values.

Assumptions

The analysis includes the following assumptions:

- No available statewide GIS data track whether or not inventoried lands with wilderness characteristics have been assessed in an RMP revision and decisions have been made about whether to protect their wilderness characteristics. As such, all lands with wilderness characteristics are treated as if their wilderness characteristics are not protected, and impacts on them are discussed.
- Management to protect GRSG under Alternatives B through F and the Proposed Plan could provide additional protections of wilderness characteristics and, at a minimum, would provide complementary management.

4.19.2 Nature and Type of Effects

Wilderness characteristics are primarily influenced by actions that impact the undeveloped nature of the area or by activities that increase the sights and sounds of other visitors. These actions and activities could damage the qualities listed in BLM Manual 6310 (naturalness, outstanding opportunities for solitude, and opportunities for primitive and unconfined types of recreation) that make up the criteria for wilderness characteristics (BLM 2012j). Generally, actions that create surface disturbance degrade the naturalness of wilderness characteristics, as well as the setting for experiences of solitude and primitive recreation. In addition, restrictions on dispersed recreation (e.g., prohibiting campfires or permitting camping only in designated sites) diminish the opportunities for unconfined recreation.

Management actions that could impact an area's natural appearance include the following:

- Presence or absence of roads and trails and use of motorized vehicles along those roads and trails
- Fences and other improvements
- The nature and extent of landscape modifications
- Other actions that result in surface-disturbing activities

All of these activities affect the presence of human activity and, therefore, could affect an area's natural appearance. Prohibiting surface-disturbing activities and new developments within lands with wilderness characteristics would protect naturalness.

Two other wilderness characteristics—outstanding opportunities for solitude or primitive and unconfined types of recreation—are related to the human experience in an area. Visitors can have outstanding opportunities for solitude or for primitive, unconfined recreation under the following conditions:

- When the sights, sounds, and evidence of other people are rare or infrequent
- Where visitors can be isolated, alone, or secluded from others
- Where the use of the area is through nonmotorized, nonmechanized means
- Where there are no developed or only minimally developed recreation facilities.

High concentrations of recreation users (large group sizes or frequent group encounters) would decrease outstanding opportunities for solitude. Limiting visitor use to prevent substantial degradation of naturalness and opportunities for solitude would confine recreation to some extent.

Any increase in travel on existing routes could reduce opportunities for solitude by increasing sights and sounds of other people. Any increase in motorized and mechanized access would also reduce opportunities for primitive recreation. The existence of trails open to motorized and mechanized travel could reduce the natural appearance in the vicinity of the trails. Effects would be localized and would not be experienced in the unit as a whole. Prohibiting motorized and mechanized use on lands with wilderness characteristics would enhance those characteristics by restricting activities that could impact natural appearance and opportunities for solitude and primitive and unconfined recreation. Increased motorized and mechanized use of routes by established livestock grazing permittees would impact opportunities for solitude and naturalness of appearance. Creating new routes would impact naturalness and size, if created by mechanical means.

While vegetation treatments are implemented, both naturalness and solitude experienced by recreational users could be impacted in the short term. The presence of treatment crews would decrease the sense of solitude and the presence of machinery and/or tools necessary for treatments would lessen the sense of naturalness. After the treatment is over, solitude would be restored with the departure of treatment crews. Over the long term, naturalness would likely be enhanced by restoring natural vegetation structures and patterns although stumps may remain for many decades where juniper treatments occurred.

Managing for wildland fire could impact wilderness characteristics. In areas where suppression is a priority, vegetation modification could prevent the spread of fires, potentially reducing the natural appearance. Wildfire management and prescribed burns could have short-term impacts on wilderness characteristics by disturbing naturalness and the sense of solitude, but over the long term it could improve ecological function. Constructed fuel breaks would reduce naturalness, whereas designated fuel breaks that use natural features only, such as rimrock and wet areas, would have no effect on naturalness. The degree of reduction in naturalness from constructed fuel breaks would depend on fuel break size and type and the degree to which vegetation is altered so that the fuel break can function.

Allowing any type of energy or mineral development, such as fluid, coal, nonenergy solid, locatable, and salable minerals, as well as renewable energy, would result in surface disturbance that would diminish the area's natural characteristic. Any new roads authorized for access to the development area could eliminate wilderness characteristics of the entire unit. This would be the case if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size. In addition, allowing developers regular access to the lease area or mine site would reduce opportunities for solitude.

Impacts on wilderness characteristics are possible from changes in livestock grazing and wild horse and burro management, particularly from new developments (e.g., water developments and fences) in lands with wilderness characteristics. This could lessen the natural appearance or could limit unconfined recreation. Existing range improvements used for livestock grazing and wild horses and burro management, such as fences, stock trails, and springs, would not change current wilderness characteristics. Maintaining range improvements could result in short-term impacts on solitude and naturalness. Where PHMA and GHMA were closed to livestock grazing, lands with wilderness characteristics that overlap PHMA and GHMA would experience a reduction of these impacts. Gathering operations to manage wild horse and burro populations would temporarily reduce opportunities for solitude.

ROW exclusion areas provide indirect protection of wilderness characteristics by preserving naturalness and opportunities for solitude and primitive

recreation by prohibiting disturbance from transmission lines, roads, and other utility developments.

Implementing management for the following resources would have negligible impact or no impact on wilderness characteristics for all alternatives; therefore, they are not discussed in detail:

- Special status species—GRSG
- Wildfire management
- Air quality and climate change
- Special status plants

4.19.3 Impacts Common to All Alternatives

Impacts on wilderness characteristics from water developments associated with wild horses and burros would be the same under all alternatives. All of the action alternatives (B through F) and the Proposed Plan would result in greater restrictions on resource uses and surface-disturbing activities than would management under Alternative A. These restrictions could provide incidental protection of wilderness characteristics, and wilderness characteristics in those areas could be maintained. Wilderness characteristics would likely experience either increased protection or no impacts from GRSG management and restrictions. Impacts would vary in degree across alternatives.

4.19.4 Alternative A

Under Alternative A, 192,087 acres of PHMA and GHMA are closed to off-road use. Alternative A would also limit travel to existing routes on 4,405,795 acres of PHMA and GHMA, the fewest of any of the alternatives. Lands with wilderness characteristics that overlap these areas would experience fewer of the incidental protections resulting from prohibiting or restricting motorized and mechanized use and more of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative A, 2,657,254 acres of PPH and PGH are closed to fluid mineral leasing. Closing acres to fluid minerals leasing would protect wilderness characteristics by prohibiting development and infrastructure related to those actions, subject to valid existing rights, as discussed in *Nature and Type of Effects*. Alternative A, along with Alternative D and the Proposed Plan, has the fewest acres closed to oil and gas leasing on BLM-administered lands and consequently would offer less protection of wilderness characteristics than would Alternatives B, C, E, and F.

There would be more acres of PPH and PHMA and PGH and GHMA open to livestock grazing (9,982,126 acres) under Alternatives A and B than under any of the other alternatives. Therefore, lands with wilderness characteristics that overlap livestock grazing open areas would experience fewer of the incidental protections resulting from closing acres to livestock grazing under Alternatives

A and B and more of the impacts from livestock grazing discussed in *Nature and Type of Effects*.

Under Alternative A, there are 2,362,868 acres of HMAs. Similar to livestock grazing, wilderness characteristics that overlap HMAs would experience fewer incidental protections and would result in the types of impacts discussed in *Nature and Type of Effects*.

Additionally, Alternatives A and D would have fewer acres of ROW exclusion areas (545,349 acres) in PPH and PHMA and PGH and GHMA than the other alternatives. Where lands with wilderness characteristics overlap ROW exclusion areas, this would likely result in fewer indirect protections of lands with wilderness characteristics than Alternatives B, C, E, and F. The effects of having more acres open to livestock grazing and fewer ROW exclusion areas are described in **Section 4.19.2**, *Nature and Type of Effects*.

4.19.5 Alternative B

Alternative B would close the same number of acres to off-road use as would Alternative A (192,087 acres), and would limit travel to existing routes on 7,075,386 acres, 2,669,591 acres more than under Alternative A. Lands with wilderness characteristics that overlap these areas would experience **more** of the incidental protections resulting from prohibiting or restricting motorized and mechanized use and fewer of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative B, 5,911,395 acres of PHMA and GHMA are closed to fluid mineral leasing, 3,254,141 more acres than under Alternative A. Types of effects are discussed in *Nature and Type of Effects*.

The same number of acres would be open to livestock grazing under Alternative B as under Alternative A, so impacts on lands with wilderness characteristics would be the same.

Alternative B would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative B would be the same as those described under Alternative A.

More than 8 times more acres of PHMA and GHMA would be ROW exclusion areas under Alternative B (4,547,043 acres) than under Alternative A. Where lands with wilderness characteristics overlap ROW exclusion areas, this would likely result in more indirect protection of lands with wilderness characteristics than under Alternative A, as described in *Nature and Type of Effects*.

4.19.6 Alternative C

Alternative C would limit travel to existing routes on 10,017,585 acres of PHMA and GHMA, more than double the number of acres under Alternative A and more than all of the other alternatives except the Proposed Plan. Lands

with wilderness characteristics that overlap these areas would experience more of the incidental protections resulting from prohibiting or restricting motorized and mechanized use and fewer of the impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative C, 9,751,575 acres of PHMA and GHMA would be closed to fluid mineral leasing, almost four times more acres than Alternative A. Types of effects are discussed in *Nature and Type of Effects*.

Under Alternative C, no areas would be open to livestock grazing. This would result in the most indirect protection of lands with wilderness characteristics of all the other alternatives because lands with wilderness characteristics would not be subject to the types of impacts from livestock grazing that could reduce naturalness. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in *Nature and Type of Effects*.

Alternative C would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative C would be the same as those described under Alternative A.

The same amount of PHMA would be ROW exclusion areas under Alternative C as under Alternative B. In addition, 5,669,422 acres of GHMA would be ROW exclusion areas. Management under Alternative C would have greatest potential to maintain wilderness characteristics on lands with wilderness characteristics. Allowable uses such as livestock grazing and ROWs for corridors and towers would be prohibited in PHMA and GHMA. ROW activities and associated development can reduce the size of lands with wilderness characteristics and can impair the apparent naturalness of the area and the feeling of solitude, as described in **Section 4.19.2, *Nature and Type of Effects***. Precluding these types of activities would help protect wilderness characteristics. In addition, all PHMA would be designated as a new ACEC, which would likely provide incidental protection of the 697,893 acres of PHMA within lands with wilderness characteristics.

4.19.7 Alternative D

The number of PHMA and GHMA acres closed to off-road use (i.e., limited to existing routes) would be the same as under Alternative B; impacts would be the same as Alternative B.

The number of PHMA and GHMA acres closed to fluid mineral leasing would be the same as under Alternative A, as would the impacts. Along with the Proposed Plan, this would be the fewest number of acres closed to fluid mineral leasing of all action alternatives and would result in the fewest incidental protections of wilderness characteristics.

There would be 9,923,018 acres of PHMA and GHMA open to livestock grazing under Alternative D, 59,108 fewer acres than would be open under Alternative

A. There would be 69,978 more acres of PHMA and 29,943 more acres of GHMA closed to livestock grazing under Alternative D than under Alternative A, resulting in more indirect protection of wilderness characteristics on these closed lands under Alternative D than under Alternative A. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in *Nature and Type of Effects*.

Alternative D would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative D would be the same as those under Alternative A.

Alternative D has the same number of ROW exclusion areas (545,349 acres) in PHMA and GHMA as Alternative A. Alternative D also would manage 5,961,914 acres as ROW avoidance, 2,953,743 acres more than under Alternative A. Consequently, there would be more protection of wilderness characteristics under Alternative D than under Alternative A.

Juniper treatments under Alternatives D and E could temporarily impact wilderness characteristics; however, this could enhance wilderness characteristics in the long term, as discussed in *Nature and Type of Effects*.

4.19.8 Alternative E

Alternative E would close to off-road use and limit travel to existing routes the fewest acres of Core Habitat (PHMA in the other action alternatives) and Low Density and Currently Occupied Habitat (GHMA in the other action alternatives) of any of the actions alternatives. Lands with wilderness characteristics that overlap these areas would experience the fewest incidental protections resulting from prohibiting or restricting motorized and mechanized use and the most impacts from such use as discussed in *Nature and Type of Effects*.

Under Alternative E, 5,601,984 acres of Core Habitat and Low Density and Currently Occupied Habitat would be closed to fluid mineral leasing, 2,944,730 more acres than under Alternative A. Types of effects are discussed in *Nature and Type of Effects*.

There would be the same number of acres of Core Habitat (PPH under Alternative A) and 1,685,312 fewer acres of Low Density and Currently Occupied Habitat (PGH under Alternative A) open to livestock grazing under Alternative E as under Alternative A. There would be the same number of acres of Core Habitat and 44,126 fewer acres of Low Density and Currently Occupied Habitat closed to livestock grazing under Alternative E than under Alternative A. This is the smallest number of acres closed to livestock grazing of all the alternatives and would result in fewer incidental protections from grazing of lands with wilderness characteristics.

Alternative E would have 454,297 fewer acres of low density and currently occupied habitat (GHMA under the other action alternatives) in HMAs than under Alternative A. This could result in fewer impacts on wilderness characteristics from the presence of wild horses and burros, such as those described in *Nature and Type of Effects*.

The same amount of Core Habitat (PHMA under Alternative B) would be ROW exclusion areas under Alternative E as under Alternative B. In addition, 156,523 acres of Low Density and Currently Occupied Habitat (GHMA under Alternative B) would be ROW exclusion areas. Impacts on wilderness characteristics would be similar to those described under Alternative B.

Additionally, juniper treatments under this alternative could temporarily impact lands with wilderness characteristics, as described under Alternative D.

4.19.9 Alternative F

The number of PHMA and GHMA acres closed to off-road use would be the same as under Alternative A, and impacts would be the same as Alternative A. The number of PHMA and GHMA acres limited to existing routes would be the same as under Alternative B. The impacts would be the same as under Alternative B, except that under Alternative F, seasonal buffers would apply. This would increase the possibility of incidental protections of wilderness characteristics that overlap these buffers.

The number of PHMA and GHMA acres closed to fluid mineral leasing would be the same as under Alternative C, and impacts would be the same as Alternative C.

There would be 1,118,081 acres of PHMA (24 times more acres of PHMA than would be under Alternative A) and 1,384,129 acres of GHMA (over 10 times more acres than under Alternative A) closed to livestock grazing under Alternative FA. This is the second-largest number of acres closed to livestock grazing of all the action alternatives and would result in more incidental protections from grazing of lands with wilderness characteristics than all the other alternatives except Alternative C because wilderness characteristics would not be subject to the types of impacts from livestock grazing that reduce naturalness. The effects of closing acres to livestock grazing on lands with wilderness characteristics are described in **Section 4.19.2, *Nature and Type of Effects***.

Alternative F would have the same number of acres of HMAs as Alternative A. Impacts from wild horse and burro management under Alternative F would be the same as those under Alternative A.

The same number of acres of PHMA and GHMA would be ROW exclusion areas under Alternative F as under Alternative C, so impacts on wilderness characteristics would be the same.

Under Alternative F, 17 new ACECs would be designated to conserve GRSG and other sagebrush-dependent species. The new ACECs would encompass 1,241,571 additional acres of GHMA and 2,560,384 additional acres of PHMA as compared with Alternative A. The protections and restrictions on uses within these new ACECs could provide indirect protections of wilderness characteristics where they overlap with the new ACECs, and wilderness characteristics in those areas could be maintained.

4.19.10 Proposed Plan

Under the Proposed Plan, off-road use would remain prohibited on 227,657 acres of PHMA and GHMA. This could result in more incidental protections from the types of travel impacts described in *Nature and Type of Effects*. Travel would also be limited to existing roads and trails on 9,987,722 acres of PHMA and GHMA, 5,581,927 acres more than under Alternative A.

Almost the same number of acres of PHMA and GHMA would be closed to fluid mineral leasing under the Proposed Plan as under Alternative A, which would result in similar impacts. Under the Proposed Plan, 9,956,587 acres of PHMA and GHMA would be open to livestock grazing, 25,539 acres fewer than under Alternative A. This could result in slightly more protection of wilderness characteristics under the Proposed Plan. Under the Proposed Plan, 12,435,558 more acres would be managed as ROW avoidance and 558,923 more acres would be managed as ROW exclusion than under Alternative A. This would result in more incidental protection of wilderness characteristics than under Alternative A.

4.20 SOCIAL AND ECONOMIC IMPACTS (INCLUDING ENVIRONMENTAL JUSTICE)

This section discusses social and economic impacts from proposed GRSG management actions related to other resources and resource uses. Existing social and economic conditions are described in **Section 3.21**, Social and Economic Conditions (Including Environmental Justice). This section also addresses environmental justice impacts and the differences between alternatives for the social and economic impacts identified.

This section is organized slightly differently than the sections for other resource areas. Rather than grouping the analysis of impacts by alternative, the analysis of economic impacts is grouped by affected resource followed by an overall discussion of social impacts. This grouping assists with the reader's understanding of the analytical approach and assumptions used to analyze economic and social impacts associated with each resource use and facilitates interpretation of results. Impacts are grouped by alternative in the **Summary of Economic Impacts** and **Summary of Social Impacts** and in **Table 4-52 Environmental Justice Impacts**.

4.20.1 Methods and Assumptions

Indicators

Conservation measures related to GRS habitat could have impacts on resource uses on BLM-administered lands. Impacts on social and economic conditions could result from these changes in resource uses. Many of the indicators used to characterize social and economic conditions are quantitative, including population, demographics (e.g., age and gender breakouts), local industry (e.g., recreation and mineral development), employment, personal income, and presence of minority and low-income populations. Other indicators, especially for social conditions, are qualitative.

Assumptions

For the analysis of economic impacts, quantitative estimates are provided where sufficient data or estimates are available on the potential changes in authorized uses of Federal lands under each alternative. When quantitative estimates of economic impacts were not possible, a qualitative discussion of the potential economic impacts of management actions associated with specific authorized uses is presented. Therefore, the overall economic impacts are a combination of quantitative estimates and qualitative discussion.

To the extent that there is a degree of uncertainty regarding the changes in authorized uses of Federal lands under each management alternative, this uncertainty is carried forward to the socioeconomic impacts of management alternatives.

When sufficient information was available to quantify the potential economic impact of alternatives, the IMPLAN model, which captures the indirect and induced economic effects of management alternatives in the Socioeconomic Study Area, was used to estimate impacts on outcomes, employment, and earnings in the study area. This was the case of the analysis of impacts through livestock grazing, wind energy development, and geothermal development. The analysis using IMPLAN includes those impacts derived from the multiplier effect, which captures the impact of several rounds of expenditures that follow an initial direct expenditure in the Study Area. These additional expenditures are due to income received by suppliers and employees directly benefiting from the initial expenditure, and who go on to spend a share of their income locally. This allows for a more complete picture of the economic impacts of the management alternatives in the planning area. However, the IMPLAN model is a static model, and it does not capture changes in the industrial composition of a region over time, nor does it capture dynamic effects that may be associated with processes of growth or decline, such as changes in technology or labor productivity or the feasibility of economic operations that require scale. There is, therefore, a degree of uncertainty in the estimates of impacts obtained through the IMPLAN model.

In the analysis of economic impacts of management alternatives on grazing, billed AUMs were used as a baseline, estimated as a 12-year average share of active AUMs. Active AUMs are the amount of forage from land the BLM has determined are available for livestock grazing; billed AUMs are the amount of forage that the BLM bills for annually. The analysis uses these two scenarios to describe a range of potential economic impacts of management alternatives on economic activity related to livestock grazing.

Alternatives B, D, F and the Proposed Plan include a 3 percent disturbance cap on PHMA, independent of surface ownership. If this disturbance cap is reached, economic activity on BLM lands could be curtailed further than what is described in this section for these management alternatives. All management alternatives, except for Alternatives A and E, would include an adaptive management plan where additional measures could be taken to protect GRSG habitat based on triggers linked to indicators monitored by BLM. If triggered, these additional measures could also impose additional restrictions on economic activity on BLM lands.

As a landscape level planning effort, none of the alternatives prescribe project-level or site-specific activities on BLM or Forest Service managed lands. Furthermore, the agencies' selection of an alternative does not authorize funding to any specific project or activity nor does it directly tie into the agencies' budgets as appropriated annually through the Federal budget process. As a consequence, agencies' costs and differences in program costs across alternatives have not been quantified. Information has been presented in several resource impact sections on the types of costs that might be associated with various GRSG conservation measures.

4.20.2 Nature and Type of Effects

The main economic impacts derived from changes in resource management are reflected in changes in local employment and earnings, costs incurred by the private sector, fiscal revenues, and regional growth prospects.

For the analysis of social impacts, two types of impacts capture the main social effects that can be expected from changes in resource management. The first are derived from migration induced by management actions. These impacts are induced by economic opportunities that drive population into or out of specific areas; they affect population growth as well as the demand for housing and public services. The second group of impacts describes those impacts associated with specific interest groups, community livelihoods, or minority and low-income populations (environmental justice).

Implementing management for the following resources would have negligible or no impact on socioeconomics and environmental justice across alternatives; therefore, they are not discussed in detail:

- Vegetation
- Wild horses and burros management
- Wildland fire management
- Special designations
- Air quality and climate change
- Special status plants

4.20.3 Economic Impacts

Impacts Common to All Alternatives

As described in **Chapter 3**, there have been some claims for the exploration of biomass as a renewable energy source; however, with the possible exception of the Prineville District, the suggestions have not been consistent and the management alternatives would have no impact on existing or developable project areas. There are no existing, proposed, or foreseeable solar energy zones in the primary study area (BLM 2013a).

Impacts from Management Actions Affecting Grazing Allotments

Overall Employment, Earnings, and Output per Job Impacted by Management Alternatives

As discussed in **Section 3.21**, agriculture is an important economic activity in the study area. In 2010, agriculture provided employment for nearly 11 percent of the labor force in the primary Socioeconomic Study Area. This takes into account proprietors and employees, but does not include unpaid or paid-in-kind family labor, which is typically not accounted for in labor force statistics. **Table 3-66** shows the relative share of crops and livestock and demonstrates that in Lake, Malheur, and Harney Counties, livestock grazing provides an important share of all earnings.

The potential impacts of management alternatives affecting grazing on output and employment were estimated quantitatively using the IMPLAN economic model. BLM obtained estimates of employment and output relative to Alternative A by multiplying the estimated reduction in the number of AUMs under each alternative, relative to Alternative A, by the estimated output and employment per AUM (shown in **Table R-4** and **Table R-5** of **Appendix R**, Economic Impact Analysis Methodology). Data from 2011 were used for active AUMs and an average of 2000 to 2011 data for billed AUMs because billed AUMs fluctuate from year to year. The analysis calculated a range of economic impacts. The low impact scenario represents the case where ranchers use as many of the active AUMs in GRSG habitat as possible, using active AUMs that are not currently billed as a buffer to absorb reductions in AUMs imposed by management alternatives.⁵ The high impact scenario represents the case where ranchers maintain a constant billed to active AUM ratio and where they reduce

⁵ The low impact scenario does not allow for reallocation of livestock to AUMs outside of GRSG habitat.

billed AUMs in proportion to the reduction in active AUMs. In addition, the high impact scenario considered the possibility that the loss of AUMs on public lands could lead to the loss of additional AUMs due to seasonal limitations of grazing areas. This would be the case if livestock operations have no reasonable alternative to seasonal grazing on public lands closed to grazing under a specific alternative. BLM estimated the additional loss of AUMs due to seasonal limitations on livestock grazing based on Torell et al. (2014). Further details are provided in **Appendix R**, Economic Impact Analysis Methodology.

Table 4-45, Annual Impact of Management Actions Affecting Livestock AUMs on Output, Employment, and Earnings, Compared with Alternative A, presents this range of estimates. Note that the employment estimates do not include unpaid or paid-in-kind family labor; if such labor were included, then labor use differences among alternatives would be larger.

Beyond economic impacts linked to closing federal lands to livestock grazing under Alternatives B, C, D, F, and the Proposed Plan, management alternatives could impose other costs on livestock operators as follows:

- Closure of federal lands to grazing could mean additional costs to livestock operators with construction of new water infrastructure on private lands or other infrastructure, if previously used infrastructure is no longer accessible.
- Various measures could affect the efficiency of livestock operations such as restrictions on vegetation treatments, restrictions on structural improvements, or restrictions on supplemental winter feeding.
- To the extent determined necessary in land health assessments, some allotments may be required to change livestock rotation or season of grazing, which could also affect the efficiency of farm operations.
- For Alternatives B, D, F, and for the Proposed Plan, in areas where disturbance caps are exceeded, there is potential for restrictions on new disturbance (e.g., roads) that could increase operation costs for livestock operators.

Details about impacts under each alternative are provided below.

Alternatives A, B, and E

The estimated economic effects are similar under these alternatives because the expected level of AUMs would be the same. However, under Alternatives B and E, increased restrictions would limit the livestock operators' ability to improve infrastructure or treat vegetation. These restrictions could increase livestock operators' costs

Table 4-45
Annual Impact of Management Actions Affecting Livestock AUMs on Output, Employment, and Earnings, Compared with Alternative A

	Alternatives B and E¹		Alternative C		Alternative D		Alternative F		Proposed Plan	
	Low	High	Low	High	Low	High	Low	High	Low	High
Primary Study Area										
Output	See notes	See notes	-\$56.3	-\$136.8	\$0.0	-\$0.6	-\$17.6	-\$50.9	\$0.0	-\$0.2
Employment	See notes	See notes	-621	-1,503	\$0.0	-6	-194	-560	0	-2
Earnings	See notes	See notes	-\$19.6	-\$47.7	\$0.0	-\$0.2	-\$6.1	-\$17.7	\$0.0	-\$0.1
Primary and Secondary Study Area										
Output	See notes	See notes	-\$57.3	-\$139.1	\$0.0	-\$0.6	-\$17.9	-\$51.8	\$0.0	-\$0.2
Employment	See notes	See notes	-633	-1,532	0	-6	-197	-571	0	-2
Earnings	See notes	See notes	-\$20.0	-\$48.6	\$0.0	-\$0.2	-\$6.2	-\$18.1	\$0.0	-\$0.1

Source: Calculated using the IMPLAN model, applied to active AUMs for each alternative (BLM 2015d), as explained in the text and in **Appendix R**, Economic Impact Analysis Methodology.

Note: Output and earnings are in millions of 2010 dollars.

Note: The low impact scenario does not allow for reallocation of livestock to AUMs outside of GRSG habitat.

¹Based on available AUMs, there would be no change in economic activity from grazing under Alternatives B and E. However, as described in the text, management actions under Alternatives B and E would restrict vegetation treatments and range improvements, which may increase ranch operators' costs or lead to other adverse economic impacts. Restrictions on travel and realty management would limit other uses, potentially benefitting grazing from reduced disturbance.

or farm efficiency. In addition, under Alternative B, there would be a disturbance cap that would limit new range improvements and other development in areas where the cap is reached.

Alternative C

There would be a reduction in the economic impact of grazing due to the closure of all allotments in PHMA and GHMA. The BLM estimates this loss of AUMs to correspond to between \$56 million and \$137 million annually in output, between \$19 million and \$48 million annually in labor earnings, and between 621 and 1,503 annual jobs in the primary Socioeconomic Study Area. The relatively broad range of impacts is due in part to the fact that these estimates incorporate the possibility that some livestock operations may actually go out of business due to closure of livestock grazing on federal lands. Additional costs associated with closure of federal lands to grazing include potential construction of new infrastructure that may no longer be accessible.

Alternative D

Under Alternative D, key RNAs with at least 20 percent PHMA or 50 percent GHMA would be closed to grazing and would be unavailable for the life of the plan. This would result in a loss of AUMs to the extent that livestock operators are unable to reallocate livestock to allotments in GRSG habitat previously not used and still open for grazing. This reduction would occur largely in Malheur, Lake, and Harney Counties. The loss would correspond up to an estimated \$0.6 million annually in output, \$0.2 million annually in labor earnings, and 6 annual jobs in the primary Socioeconomic Study Area. In addition, under Alternative D livestock operators could face costs associated with construction of new water developments, changes in livestock rotation or season of grazing and restrictions to supplemental winter feeding. In areas where disturbance caps are exceeded there is the potential for restrictions on new disturbance.

Alternative F

Under Alternative F, at least 25 percent of the area for livestock grazing in GRSG habitat would be rested every year and no longer available for grazing. The BLM estimates this loss of AUMs to correspond to between \$17 million and \$51 million annually in output, between \$6 million and \$18 million annually in labor earnings, and between 194 and 560 in annual jobs in the primary Socioeconomic Study Area. In addition, under Alternatives F increased restrictions would limit the livestock operators' ability to improve infrastructure or treat vegetation. These restrictions could increase livestock operators' costs or reduce farm efficiency. In addition, under Alternative F, there would be a disturbance cap that would limit new range improvements and other development in areas where the cap is reached. Unlike Alternatives B and D, under Alternative F fire disturbance is included under the 3 percent disturbance cap.

Proposed Plan

Under the Proposed Plan there would be a reduction of 2,388 AUMs relative to Alternative A. This reduction would occur in nine RNAs in Malheur County (1,550 AUMs), three RNAs in Lake County (791 AUMs), and one RNA in Harney County (47 AUMs). This reduction would affect 13 grazing allotments and represents approximately 0.3 percent of the active AUMs in the planning area. The BLM estimates this loss of AUMs to correspond to up to \$0.2 million annually in output, up to \$0.1 million in labor earnings, and up to 2 annual jobs in the primary Socioeconomic Study Area. To the extent that the livestock operators compensate for the loss of grazing areas on BLM lands by acquiring forage from private lands, this forage would have a higher cost. In addition, under the Proposed Plan livestock operators could face costs or loss of farm efficiency associated with construction of new water developments, changes in livestock rotation or season of grazing, and restrictions to supplemental winter feeding. In areas where disturbance caps are exceeded there is the potential for restrictions on new disturbance. Under the Proposed Plan, permit renewals would be prioritized in Sagebrush Focal Areas (SFA), and in PHMA outside of the SFA. If the standards for rangeland health are not met the season of use may be adjusted, and livestock numbers and AUMs may be reduced.

In summary, economic impacts from closures to livestock grazing in PHMA and GHMA and potential increases in costs to operators are greatest under Alternative C, followed by Alternative F. Some reductions in AUMs in RNAs would occur under Alternative D and under the Proposed Plan. Although no reductions in AUMs would be expected under Alternatives B and E, restrictions on vegetation treatment and structural improvements would have increased costs to operators. Under Alternatives B, D, E, F and the Proposed Plan livestock operators would face a potential increase in management costs with the greatest costs expected under Alternatives B and F and the least costs under Alternatives D and E and the Proposed Plan. Actual cost impacts are not possible to quantify.

As previously noted, **Table 3-66** shows that, although livestock grazing has some economic importance to all counties in the study area it constitutes a larger share of earnings in Lake, Malheur, and Harney Counties. **Figure 2-1**, Greater Sage-Grouse Habitat in the Planning Area, shows that these three counties are also where the most PHMA and GHMA are located. This suggests economic impacts of management alternatives on livestock grazing may be of particular importance to these three counties. Within these counties, communities may be impacted differently, depending on their own dependency on livestock grazing where it overlaps with GRSG habitat.

Output, employment, and earnings losses reported above, although stemming from direct impacts on livestock grazing, would not all occur in the livestock ranching industry, but also in industries that provide inputs and services to these activities and in industries where labor earnings in livestock ranching are spent.

Industries where these impacts would occur include support activities for agriculture and forestry, grain farming, all other crop farming, animal production, veterinary services, retail stores, food services and drinking places, and real estate, among others.

Additional discussion of the potential impacts on communities is included in **Section 4.20.4, Social Impacts**.

Other Values Associated with Livestock Grazing

As described in **Chapter 3**, BLM-administered land managed for livestock grazing provides both market values and nonmarket values. Nonmarket values include open space and western ranch scenery. These provide value to some residents and outside visitors, and ranches may also provide some public value, such as the cultural icon of the American cowboy. Some residents and visitors also perceive nonmarket opportunity costs associated with livestock grazing; in addition, some of the lifestyle value of ranching is likely to be captured in markets, such as property values of ranches adjacent to BLM-administered lands.

The “Other Values” discussion in **Section 3.2I** provides additional discussion of these values. Overall, when analyzing net public benefits, the process is uncertain for incorporating potential nonmarket values from managing public land for livestock grazing. The scientific and economic literature on the topic does not provide adequate data or a consensus theoretical framework from which to analyze these values further. Because of this, the BLM did not attempt to quantify these values for this study.

Livestock grazing is one tool that has proved effective in controlling post-fire spread of invasive annual grasses. The spread of invasive annual grasses can lead to a variety of adverse impacts on the human environment including, for example, increased risk for subsequent fires that could threaten forage and structures on public and private lands, reduced hunting opportunities resulting from habitat quality impacts, and potential air quality impacts from dust storms. The closure of large areas to livestock grazing under Alternative C could increase the likelihood of adverse post-fire outcomes when compared with Alternative A. The likelihood of post-fire outcomes to be affected by reductions in permitted AUMs in Alternative F (compared with Alternative A) is uncertain. No noticeable effect of reductions in permitted AUMs on the likelihood of post-fire outcomes would be expected under the remaining alternatives or the Proposed Plan.

To the degree that there are net benefits of nonmarket values attached to livestock grazing and ranching, these would be greatest under Alternatives A and E. This is because both alternatives are likely to result in similar levels of livestock grazing operations in the Study Area. If the net nonmarket value of livestock grazing and ranching is positive, then that value would be greatest under Alternative A; it would be slightly lower under Alternatives B and E,

lower under Alternative D, lower still under Alternative F, and lowest under Alternative C. This is in line with the expected impacts on market values discussed above.

Impacts from Management Actions Affecting Recreation

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

As discussed in **Chapter 3**, recreation is a consistent contributor to the economy of the various counties in the Study Area. Management activities included in the proposed alternatives could affect recreation by, for example, restricting motorized travel. However, in general, restrictions imposed by management alternatives are expected to have little perceptible impact on recreation. For example, seasonal restrictions would often not coincide with recreation seasons, such as that for hunting. BLM recreation specialists predict the alternatives would not result in measurable impacts on recreation visitor days, although some types of recreation may be affected, particularly motorized travel.

Under some alternatives, restrictions or modifications would be placed on SRPs during certain times of the year or in certain locations when and where they may be detrimental to GRSG habitat. The BLM does not expect these restrictions to limit recreation use of BLM-administered lands, but rather to relocate use to areas or periods where no conflict with GRSG habitat would exist.

The Proposed Plan would not allow new recreational facilities in PHMA. In the past decade, BLM has not typically built recreational facilities in Eastern Oregon, and the extent to which this would alter recreation trends in the Study Area is not clear. Forms of recreation that favor an undeveloped setting could benefit while activities that make use of recreational facilities would be hampered or steered towards other areas.

Changes in travel management could also affect recreation and resulting economic activity, with restrictions on motorized travel under certain alternatives, during certain times of the year. Because opportunities for recreation in a more natural or primitive setting could increase, the net economic effect on recreation is not possible to quantify.

Alternative A

Existing recreation opportunities in the Study Area would be maintained. Alternative A would not result in impacts on revenue of commercial recreation service providers or managing agencies attributable to SRPs. This is because it would result in no changes to current management.

Alternatives B, D, E, and F

Overall visitation levels and the corresponding economic impact of recreation expenditures in the Study Area would not be substantially different from Alternatives A and C. However, limitations on SRPs and motorized travel restrictions could lead to some added costs to recreational users of BLM-administered lands. This could result from having to circumvent closed areas or adopting less preferred options in certain activities. These include hunting, where ATV use is prevalent for retrieving game, or other activities that make use of motorized travel. Beneficial impacts could arise from enhanced opportunities for recreation, such as backcountry camping or low-density hiking, as well as opportunities for such activities as hiking, horseback riding, and hunting in a more primitive setting. The net economic effect on recreation is not possible to quantify, and the net direction (positive or negative economic effect) is uncertain.

Alternative C

Economic impacts of Alternative C are the same as those of Alternative A. The limitations on SRPs and motorized travel restrictions of Alternatives B, D, E and F would not be implemented in Alternative C and Alternative C would result in no substantial changes to current management that could affect recreation.

Proposed Plan

Under the Proposed Plan, overall visitation levels and the corresponding economic impact of recreation expenditures in the Study Area would not be substantially different from Alternatives A, B, C, D, E and F. The Proposed Plan would not allow new recreational facilities in PHMA and this could potentially hamper future growth of some forms of recreation in those areas. Because there has not been a clear trend of building new recreational facilities on BLM lands in Eastern Oregon, the extent to which the Proposed Plan would limit growth of recreational activities is unclear.

Other Values Associated with Recreation

As described in **Chapter 3**, only a portion of the value of recreation on public lands is captured in the marketplace. Here, the concept of consumer surplus is used to measure the nonmarket portion of recreation value. As noted in **Section 3.21**, these nonmarket values are not directly comparable to output, earnings, or jobs associated with various resource uses on BLM-administered lands, which are described elsewhere in this section.

As discussed above, BLM recreation specialists determined none of the alternatives would result in measurable impacts on recreation visitor days. Therefore, there would be no discernible change in nonmarket recreation values.

Impacts from Management Actions Affecting Mining

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

As described in **Chapter 3**, mining is a relatively minor contributor to the economy of the Study Area, with approximately 0.9 percent of total private employment, slightly higher than the national average of 0.6 percent. There is no coal production in the Study Area, and there is no oil and gas production from federal mineral estate. As described in **Section 3.21**, the average annual wage per job in the mining sector is comparable to the general average for the primary Study Area, although higher than that of sectors such as grazing or recreation. Reasonably Foreseeable Development Scenarios (RFDs) and Mineral Potential Reports (MPRs) were not completed for this exercise. Therefore, the below assessment of impacts is based on BLM review of current conditions and broad trends.

Any future production of oil and gas in the Study Area would have the greatest impacts under Alternatives C and F, under which all GRSG habitat would be closed for exploration. Alternatives B and E would impose fewer closures than Alternatives C and F (all PHMA in the case of Alternative B, Core Area habitat in the case of Alternative E). The Proposed Plan would impose a No Surface Occupancy (NSO) restriction with no Waivers, Exceptions, and Modifications (WEMs) in SFA and with few WEMs in PHMA outside SFA. In practice, oil and gas development in PHMA under the Proposed Plan is unlikely because of the pioneer nature of oil and gas in the area, with little exploration and lack of infrastructure, making the added costs of directional drilling prohibitive to oil and gas development. The effect would be similar to that of Alternatives B and E. Alternative D would impose the fewest restrictions on future oil and gas development, after Alternative A, with buffer areas around leks and constraints on surface occupancy. NSO constraints under Alternative D include a greater number of WEMs and are not expected to be as restrictive as those under the Proposed Plan. However, because no development of oil and gas are projected for the Study Area, no impacts of alternatives on output, employment, and earnings are expected under any of the Alternatives.

The main locatable mineral produced in the Study Area is gold in Baker County. According to 2012 County Business Patterns data from the US Census Bureau, employment in gold in Baker County was less than 20 employees (US Census Bureau 2014). The Celatom Mining Complex in Malheur and Harney Counties mines Diatomaceous Earth (BLM Undated). There has also been some interest in uranium.

Under Alternatives A, 10 percent of the federal mineral estate decision area would remain withdrawn from development of locatable minerals, with an additional 0.1 percent recommended for withdrawal. Petitions for withdrawal require that validity exams be conducted on existing mining claims when a

Notice or Plan of Operation is proposed and on notices or Plans of Operation for material changes in existing operations. This delays the start or expansion of mining operations and increases costs.

Alternatives B, E, and F would increase the federal mineral estate recommended for withdrawal by approximately 22 percent of the federal mineral estate for locatables, in addition to the currently withdrawn 10 percent. The Proposed Plan, would increase the federal mineral estate recommended for withdrawal by a almost 3 percent of the federal mineral estate, in addition to the currently withdrawn 10 percent. Alternative C would increase the federal mineral estate recommended for withdrawal by 60 percent of the federal mineral estate, in addition to the currently withdrawn 10 percent. Alternative D is similar to Alternative A, but it would recommend limits on surface disturbance and mitigation of impacts on GRS habitat.

No Reasonably Foreseeable Development scenario for locatable minerals was developed for this landscape level planning amendment that forecasts production of locatable minerals on Federal lands in the Study Area. In the absence of this information, it is not possible to quantify potential economic impacts across alternatives over the planning horizon. Nor is it possible to assess the extent to which development of locatable minerals on split-estate lands would be affected. However, as discussed above, under Alternatives C, E, F, and the Proposed Plan, costs could arise for validity exams for claims or operations looking to expand in areas that are withdrawn. Validity exams cost in the range of \$150,000 to \$200,000, excluding contest costs, and are born by the claimants who initiate the action. In the case of Alternative B, validity exams are recommended for every existing claim. As this is an action initiated by the government, the cost is born by the government. In addition to the costs of validity exams, no new claims could be made to explore or mine locatable minerals in withdrawn areas which could possibly impact economic activity under Alternatives B, C, E, F, and the Proposed Plan when compared with Alternatives A and D.

Salable minerals in the study area are sand, gravel, limestone, dimension stone, and other crushed and broken stone. Main areas of production are found in Baker, Crook, Lake, and Union Counties. According to 2012 County Business Patterns data from the US Census Bureau, approximate levels of employment in the salable minerals industry ranged from none in Grant County to a high of between 100 and 249 people in Baker County; for the seven counties, the total is between 128 and 313 (US Census Bureau 2014)⁶. The salable minerals sector is by far the main source of overall mining employment in the Study Area.

⁶ This range is consistent with the estimates shown in Section 3.21. *Social and Economic Conditions (Including Environmental Justice)* for overall employment in the mining sector. The estimates shown Section 3.21 use other US Census Bureau data to fill in nondisclosure gaps to provide an estimate for the data presented here as a range.

Under Alternative A,, approximately 26 percent of the federal mineral estate would be closed to salable minerals development. This percentage would increase to approximately 52 percent under Alternatives B, D, E, F and the Proposed Plan, and to 83 percent under Alternative C. If employment were to fall proportionally to closures of federal mineral estate, the impact on salable minerals-related employment in the Study Area would be a loss of between 45 and 163 jobs under Alternatives B, D, E, F and the Proposed Plan and between 99 and 241 jobs under Alternative C. The impacts of Alternative B, C, D, E, F, and the Proposed Plan could be larger due to ROW avoidance and exclusion increases in several of these alternatives relative to Alternative A. These avoidance and exclusion increases potentially affect salable minerals through increased costs of minerals development and decreased construction and derived demand for mineral materials. ROW exclusion and avoidance areas would be the greatest under Alternative C and the least under Alternatives A and E.

The closure of federal mineral lands to salable mineral development could also impact the cost of public projects in the Study Area. Salable minerals from BLM-administered lands are typically available to local governments free of charge. Closures of federal lands to salable mineral development could force local governments to obtain mineral materials from more expensive sources. The largest cost in obtaining mineral materials is often transportation of these mineral materials. Having to access more distant sources could increase the cost of construction and maintenance projects for local government (e.g., road maintenance). The Proposed Plan allows restricted exceptions to free use permits, potentially lessening the impact on local governments, when compared with Alternatives, B, C, D, E, and F.

Appendix A, Chapter 2 Alternatives Figures, shows salable minerals areas and constraints under the various management alternatives. Relative to Alternative A, closures or restrictions to salable mineral development under Alternatives B, D, E, F, and the Proposed Plan would affect locations throughout the Study Area, with large extensions in Lake, Harney and Malheur Counties. Alternative C would add closures to various locations that otherwise would remain open to salable mineral development, particularly in central and northern portions of Lake and Harney Counties.

Impacts from Management Actions Affecting Geothermal Exploration and Development

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

As described in the 2008 Geothermal Programmatic EIS (BLM and Forest Service 2008), the entire Study Area for this EIS has potential for geothermal development. During the Programmatic EIS process, the BLM also developed a reasonably foreseeable development scenario over 20 years for the

development of federal geothermal resources, based on a review of government and industry reports. **Table 4-46**, Reasonable Foreseeable Development Scenario for Geothermal Energy on BLM-Administered Lands, shows the projects identified in the reasonably foreseeable development scenario that are in the Socioeconomic Study Area for this EIS, along with potential electricity generation for 2025.

Construction and operation expenditures associated with geothermal electricity exploration and development include those for drilling wells, constructing power plants, and operating facilities. The geothermal reasonably foreseeable development scenario provides only information on electricity generation capacity; it does not provide additional details that would be necessary to develop a detailed economic impact estimate, such as resource temperature and depth. These data were also not readily available from other sources.

Table 4-46
Reasonable Foreseeable Development Scenario for Geothermal
Energy on BLM-Administered Lands

Area	Projected MW at 2025	BLM Field Office
Neal Hot Springs	50	Vale
Lakeview—Hot Lake Area	20	Lakeview
Summer Lake	50	Lakeview
Other Potential Locations	50	Includes Burns and Vale
Total	170	

Source: BLM and Forest Service 2008

MW megawatts

Nonetheless, to provide an estimate of economic impact that would be associated with the development of the above projects, the BLM made reasonable assumptions based on available information⁷. The geothermal reasonably foreseeable development scenario does not provide detailed location information, and at this time the BLM is uncertain how the potential projects shown would be affected by the management alternatives. In order to provide a quantitative estimate of how economic impacts might differ by alternative, the BLM assumed impacts would occur in proportion to the acres open to geothermal leasing under each alternative. However, depending on specific locations and project parameters, the impact of management alternatives may

⁷ The BLM assumed the capacity estimates from the October 2008 Geothermal Programmatic EIS, which are consistent with estimates from the Geothermal Task Force Report of the Western Governors' Association (WGA 2006), represent nameplate capacity (including parasitic losses). The BLM assumed the geothermal plants would be developed using conventional hydrothermal, binary cycle technology, with an average resource temperature of 300 degrees at a depth of 3,000 feet, which is roughly consistent with the currently operating commercial energy plant at Neal Hot Springs (Clutter 2010; ODEQ 2010b). Construction was assumed to be distributed over a 10 year period.

not be proportional to the acres open for geothermal leasing and the estimates below may overestimate or underestimate the impacts.

Table 4-47 shows the estimated impacts by alternative, using default parameters from the National Renewable Energy Laboratory's Jobs and Economic Development Impact model (NREL 2012).

Table 4-47
Economic Impact of Management Actions Affecting Geothermal Exploration and Development Compared with Alternative A

	Alternative B, E—Alternative A	Alternative C, F—Alternative A	Alternative D— Alternative A	Proposed Plan— Alternative A
Construction (representative for one year)				
Output	-\$5,450,444	-\$11,994,622	\$0	-\$5,630,937
Employment (jobs)	-64	-140	0	-66
Earnings	-\$2,223,289	-\$4,892,724	\$0	-\$2,296,914
Operations (for year 5 of planning period)				
Output	-\$1,984,767	-\$4,367,815	\$0	-\$2,050,493
Employment (jobs)	-16	-36	0	-17
Earnings	-\$1,489,104	-\$3,277,025	\$0	-\$1,538,416

Source: Calculated using the IMPLAN model as explained in the text and in **Appendix R**, Economic Impact Analysis Methodology.

Notes: Output and earnings are in millions of year 2010 dollars. The economic impact for operations in year 5 of the planning period represents the point at which half of the expected geothermal power plants have been developed and are operating.

Alternative A

Under Alternative A, the BLM projects the 170 megawatts of geothermal energy shown in **Table 4-46** to be in place by 2025. This development would be estimated to support an average of 187 annual jobs during the construction period and 48 annual jobs during operations (not shown in Table 4-52).

Alternatives B and E

Access to geothermal potential could be limited. Acres open to leasing would be reduced by over one-third, compared with Alternative A, which could reduce access to geothermal potential. If these closures were to include the areas identified in the geothermal reasonably foreseeable development scenario, the development of geothermal energy could also be reduced, compared with

Alternative A. If the reduction is proportional to the reduction in acres open to leasing, Alternatives B and E would imply a loss of an estimated 64 annual jobs during construction and about 16 annual jobs during operations, compared with Alternative A.

Alternatives C and F

Acres open to leasing would be reduced by approximately 75 percent. Alternatives C and F would be the most likely to constrain development of geothermal energy resources. If closures were to include the areas identified in the geothermal reasonably foreseeable development scenario, the development of geothermal energy would be reduced, relative to Alternative A. If the reduction were proportional to the reduction in acres open to leasing, Alternatives C and F would imply a loss of an estimated 140 annual jobs during construction and about 36 jobs during operations,, compared with Alternative A.

Alternative D

Based on acres open to leasing, projected employment under Alternative D would be the same as under Alternative A. However, some decrease relative to Alternative A could occur due to NSO stipulations in buffer areas around leks.

Proposed Plan

The Proposed Plan would establish a NSO with WEM in PHMA outside SFA and a NSO without WEM in SFA. Because the potential for geothermal development using horizontal drilling is limited due to thermal gradient drops in transport, these NSOs would make geothermal development in SFA and in PHMA outside SFA unlikely. Acres open to leasing without NSOs would be reduced by over one-third, compared with Alternative A. Assuming the development of geothermal energy would be reduced in proportion to the acres with geothermal potential not closed or under NSOs, the socioeconomic impact would be similar to that of Alternative B. Compared with Alternative A, the Proposed Plan would imply a loss of an estimated 66 annual jobs during construction and about 17 annual jobs during operations.

Impacts from Management Actions Affecting Wind Energy Development

Overall Employment, Earnings, and Output per Job Impacted by Management Alternatives

The socioeconomic impact of management alternatives on wind energy development depends on trends in wind energy development and the extent to which proposed sites overlap with GRSG habitat. For the purposes of the socioeconomic impact analysis, the BLM used a scenario based on the existing applications at the time of this EIS. Under this scenario the BLM projects that 182 megawatts of wind energy installed capacity expected to occur under Alternatives A, D, and E would no longer occur under Alternatives B, C, F, and the Proposed Plan. This installed capacity corresponds to two existing

applications in Harney County that overlap GRSG habitat. Additional wind energy development could also be affected by the choice of management alternatives as described further below. **Tables 4-48, Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Construction**^{1,3}, and **4-49, Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Operations**, show the estimated impacts of the choice of management alternative on output, employment, and earnings generated by these two projects in Harney County.

Alternative A

Under Alternative A, the BLM projects the 182 megawatts of installed capacity planned for Harney County would be in place by 2025. BLM estimates this would support an average of 60 annual jobs to Study Area over a 10-year period. In addition, exclusion and avoidance areas would not impede additional wind energy investments in most of the planning area.

Table 4-48
Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Construction^{1,3}

	Alternatives B, C, F, and the Proposed Plan²	Alternatives D and E²
<i>Primary Study Area</i>		
Output	-\$6.9	See notes
Employment (jobs)	-43	See notes
Earnings	-\$1.9	See notes
<i>Primary and Secondary Study Area</i>		
Output	-\$7.1	See notes
Employment (jobs)	-44	See notes
Earnings	-\$2.0	See notes
<i>Harney County</i>		
Output	-\$5.9	See notes
Employment (jobs)	-23	See notes
Earnings	-\$0.9	See notes

Source: Calculated using the IMPLAN model as explained in the text and in **Appendix R, Economic Impact Analysis Methodology**.

¹Average annual impacts of construction calculated distributing impacts over a 10 year period.

²Based on installed megawatts, there would be no change in economic activity from wind energy under Alternatives D and E, relative to Alternative A. However, as described in the text, management actions under Alternatives D and E could increase costs and discourage additional wind energy investments.

³Output and Earnings are in millions of 2010 dollars

Table 4-49
Average Annual Impact on Wind Energy Development on Output, Employment, and Earnings by Alternative Compared with Alternative A, Operations^{1,3}

	Alternatives B, C, F, and Proposed Plan²	Alternatives D and E²
Primary Study Area		
Output	-\$1.4	See notes
Employment (jobs)	-17	See notes
Earnings	-\$0.8	See notes
Primary and Secondary Study Area		
Output	-\$1.4	See notes
Employment (jobs)	-17	See notes
Earnings	-\$0.8	See notes
Harney County		
Output	-\$1.3	See notes
Employment (jobs)	-16	See notes
Earnings	-\$0.7	See notes

Source: Calculated using the IMPLAN model as explained in the text and in **Appendix R**, Economic Impact Analysis Methodology.

¹Average annual impacts of operations calculated assuming capacity installed over a 10 year period. Impacts would be representative of year 5.

²Based on installed megawatts, there would be no change in economic activity from wind energy under Alternatives D and E, relative to Alternative A. However, as described in the text, management actions under Alternatives D and E could increase costs and discourage additional wind energy investments.

³Output and earnings are in millions of 2010 dollars.

Alternative B

Under Alternative B, the BLM projects the 182 megawatts of installed capacity planned for Harney County would no longer occur. This corresponds to an estimated average reduction of 60 annual jobs when compared with Alternative A over a 10 year period (between construction and operations). Additional investments in wind energy could also be affected due to PHMA exclusion and GHMA avoidance, with the potential of increased costs in routing of transmission lines and access roads and potential mitigation costs.

Alternative C

Under Alternative C, the BLM projects the 182 megawatts of installed capacity planned for Harney County would no longer occur with the estimated average reduction of 60 annual jobs when compared with Alternative A over a 10 year period (between construction and operations). Additional investments in wind energy could also be affected due to the closure of all GRSG to new ROW authorizations.

Alternative D

Under Alternative D, the BLM projects the 182 megawatts of installed capacity planned for Harney County would be in place by 2025. Restrictions to

additional wind energy development would be greater than under Alternative A, because wind energy would be avoided in PHMA. Increased costs to investors could occur due to impacts of PHMA avoidance on transmission lines and access roads and due to potential mitigation measures required by BLM.

Alternative E

Under Alternative E, the BLM projects the 182 megawatts of installed capacity planned for Harney County would be in place by 2025. Restrictions to additional wind energy development would be greater than under Alternative A, because wind energy would not be allowed to develop in PHMA where there is evidence of GRSG.

Alternative F

Under Alternative F, the BLM projects the economic impacts from wind energy development to be the same as under Alternative C.

Proposed Plan

Under the Proposed Plan, wind energy development would be avoided in GHMA. In PHMA, wind energy development would be avoided outside SFA in Harney, Lake, and Malheur Counties and excluded in other PHMA. Avoidance of ROW authorizations in PHMA and of major ROW authorizations in GHMA could further impact wind energy development. Under the Proposed Plan, the 182 megawatts of installed capacity planned for Harney County may no longer occur due to the increased costs to investors in either relocating development or meeting mitigation requirements for development in avoidance areas. For the purposes of the socioeconomic analysis, the BLM considered that these 182 megawatts of wind energy installed capacity would no longer occur under the Proposed Plan.

Output, employment, and earnings reported above include direct, indirect, and induced impacts compared with Alternative A. Thus, the estimated economic activity reflects not only the wind energy industry, but also industries that provide inputs and services to this activity and industries where associated labor earnings are spent. The main industries where these impacts would occur include mining and quarrying, retail stores, concrete manufacturing, food services wholesale trade, transport by truck, and hotels, mainly during the construction period.

Impacts from Management Actions Affecting Lands and Realty and Travel Management

Direct Economic Activity Dependent on BLM-Administered Land and Resource Management

Management actions that affect development of infrastructure could have effects on the growth of economic activity in the Socioeconomic Study Area. Limiting new ROWs for power lines, pipelines, and access routes or restrictions to route construction and to travel on existing roads could increase the cost of

new economic investments. It could even make them no longer economically viable.

Alternative A

Alternative A would place the fewest restrictions on ROW development and route construction and would maintain the largest area open to travel, among the alternatives; therefore, having the least impacts of the alternatives.

Alternative B

Management actions under Alternative B to protect GRSG habitat would impact lands and realty through the closure of PHMA to new ROW authorizations. Burial of power lines could be required when technically and financially feasible. All cross-country motorized travel would also be prohibited except for designated routes; that is, motorized travel would be limited to existing routes. Alternative B would impose added costs to future economic investments in the Study Area, when compared with Alternative A.

Alternative C

All GRSG habitat, PHMA, and GHMA would be closed to new ROW authorizations. This alternative would impose the greatest restrictions on new infrastructure development. Potential new investments in power lines, pipelines, roads and renewable energy projects requiring new ROW authorizations in GRSG habitat would not occur, potentially reducing the generation of associated employment and earnings opportunities. To the extent that new projects are modified to move forward off Grater Sage-Grouse habitat, economic activity generated by the construction and operation of a modified project would support regional economic activity. However, modification to projects would typically have a cost. To the extent possible, utilities would be expected to pass these costs to consumers. Restrictions on travel management would be the same as those under Alternative A.

Alternative D

ROW development under Alternative D would also face restrictions, but these would be more limited than under Alternatives B and C. Exclusion areas in GRSG habitat would be the same as under Alternative A, but PHMA would be managed as avoidance. Burial of power lines could be required when technically and financially feasible. Restrictions to travel would be the same as those under Alternative B. Restriction and costs to infrastructure development under Alternative D would be greater than under Alternative A but less than under Alternatives B or C.

Alternative E

Management under Alternative E would have impacts similar to Alternative B for land use authorizations and travel management.

Alternative F

Impacts from Alternative F are the same as or similar to those under Alternative B, except there would be greater restrictions under Alternative F for wind energy, as previously described. New road construction or upgrades would not be allowed in GRSG habitat, resulting in future potential limitations to economic activity in the area.

Proposed Plan

Under the Proposed Plan, impacts would be similar to those under Alternative D. Increased avoidance in PHMA, compared with Alternative A, means project proponents would typically need to alter preferred locations or alignments or accept mitigation measures imposed for development in avoidance areas, which would have a cost to project proponents. As under Alternatives B and D, motorized travel would be limited to existing routes.

Restrictions to ROW development under Alternatives B, C, D, E, F, and the Proposed Plan could require investors to relocate or reroute infrastructure investments. When feasible, such modifications would have a cost that would typically be passed on to consumers. A 2012 WECC study, for example, provides information on transmission line costs per mile, ranging from \$927 thousand to \$2,967 thousand depending on voltage and whether lines are single or double circuit lines. The same study provides cost multipliers for difficult terrains, reaching up to 2.25 in the case of forested lands (WECC 2012). Because utility providers allocate costs on to their rate base, per-customer rate impacts would be greater where the ratepayer base is smaller, all else being equal (i.e., given an identical fixed cost associated with burial of transmission lines). Areas with smaller and local utility providers with fewer ratepayers would be required to absorb a greater proportion of the costs of relocation or rerouting compared with areas serviced by larger, multi-state providers. Alternatives B, D, and the Proposed Plan could require burial of transmission lines when technically and financially feasible. New construction costs of underground transmission lines can be between 4 and 14 times higher (PSC 2011), depending on terrain, although burial of existing lines would be a fraction of the cost of new lines. Burial of distribution lines would be considerably less, averaging under \$500 per mile in rural areas (EIA 2012).

ROW restrictions in PHMA or GHMA could also impact private landowners' costs for and ability to obtain new ROW authorizations for accessing private property through BLM managed land. Landowners pay a fee for processing an application for a ROW authorization—the fee is a schedule that depicts the number of Federal staff hours needed to process the application. In cases where ROW restrictions in GRSG habitat require an alternative route to be identified or other mitigation to be performed, landowner costs could be expected to be higher for Alternatives B, C, D, E, F and the Proposed Plan when compared with Alternative A.

Impacts from Management Actions Affecting Special Status Species

Other Values Associated with Populations of GRSG

As described in **Section 3.21**, economists and policy makers have long recognized that rare, threatened, and endangered species have economic values beyond those associated with active use through viewing or hunting. **Section 3.21** documents current methods to estimate these non-use values, including a description of the literature review that the BLM conducted to determine if there were existing non-use value studies for GRSG. There are no studies on valuation specific to the GRSG, but there are several studies published in peer-reviewed scientific journals for bird species with similar characteristics. These studies find the average stated willingness-to-pay at between \$15 and \$58 per household per year in order to restore a self-sustaining population or to prevent regional extinction of the species (see **Section 3.21** for non-market valuation methods details). These values represent a mix of use and non-use values; the non-use components of value are likely to be the majority share since the studies primarily address species that are not hunted.

GRSG protection is a public good available to all households throughout the intermountain west. If similar per-household values apply and if even a small portion of the per-household value represents a non-use value, then the aggregate regional non-use value could be substantial. However, the BLM did not quantify the aggregate value because of several factors, including uncertainty over the comparability of the existing studies to the GRSG context and the documented difference between stated and actual willingness-to-pay.

From a qualitative perspective, however, the non-use values associated with populations of GRSG would correspond to the degree of habitat protection associated with each alternative. Current management, Alternative A, provides the least protection for GRSG in the planning area, so it could result in the most impacts on GRSG. As a result, to the degree that there are non-use values associated with populations of GRSG, management under Alternative A would have the greatest adverse impacts on those values.

As discussed in **Section 4.3**, most of the management actions under the alternatives would be beneficial for the GRSG. It is therefore estimated that, in comparison to Alternative A, each alternative would have a positive impact on non-use values associated with populations of GRSG. However, so many factors impact the protectiveness of each alternative, such as vegetation and soils management, livestock grazing management, fire and fuels management, and recreation management. Because of this, it is difficult to anticipate the comparative protection and therefore non-use values provided by Alternatives B through F and the Proposed Plan.

Impacts on Tax Revenues and Payments to States and Counties

Reductions in economic activity can reduce tax revenues for local, state, and federal governments. At the state level, these could take the form of reductions in personal and corporate income taxes. At the local level, revenues could be reduced if property taxes decrease. A portion of leases and royalties from activities on BLM lands (e.g., geothermal development) is also shared with counties.

The alternatives are unlikely to have a significant impact on state tax revenues, given the small share of the Study Area on total state fiscal revenues. However, local government tax revenues could be considerably affected in specific areas that would experience reductions in economic activity, particularly under Alternatives C and F. Based on the anticipated reductions in economic activity, the local communities that may be most affected by reductions in local tax revenues under these alternatives would be communities where grazing forms a major basis for the local economy in Malheur, Harney, and Lake Counties.

In FY 2013-14, farm and forest land assessed value for property taxation was, in 2010 dollars, approximately \$89.0 million in Harney County (25 percent of total property taxes in Harney County), \$117.8 million in Lake County (17.2 percent of property taxes in Lake County), and \$277.8 million in Malheur County (22.5 percent of total property taxes in Malheur County) (Oregon Department of Revenue 2014). To obtain a very rough approximation of the potential impact of Alternative C on property tax collections through impacts on livestock grazing, BLM used the estimated change in employment derived from impacts on livestock grazing as a proxy for the percent change in farm property assessed values. BLM assumed that all jobs impacted by reductions in livestock grazing would be farm related jobs and that all impacts would occur in Malheur, Harney, and Lake Counties. These assumptions overestimate the impacts. The estimated reduction in annual jobs from the impacts of Alternative C on livestock grazing is between 743 and 1,797 jobs (**Table 4-50**). If divided by the total share of farm jobs in Malheur, Harney, and Lake Counties, the reduction in jobs would correspond to between 21.3 percent and 51.6 percent of the total. If farm property assessed values were similarly impacted, the effect on total property tax assessments in Malheur, Lake, and Harney Counties would be between 4.5 percent and 11.0 percent (because farm property assessments are approximately 21.3 percent of total property assessments in the three counties). As previously noted, this likely overestimates the impacts and should be interpreted as reference for the potential magnitude of impacts. On the other hand, property taxes under Alternative C would also be affected by losses in renewable energy investments, particularly in Harney County, where expected wind energy projects would no longer occur. Utilities were responsible for 12.8 percent of total property assessed value in Harney County in FY 2013-14, 21.5 percent in Lake County, and 27.3 percent in Malheur County. (Oregon Department of Revenue 2014).

In addition, impacts on individual communities within these and other counties could be considerably greater than impacts on counties, depending on their dependency on livestock grazing. Also, reductions in assessed property values impact not only county property tax collections but also schools districts, fire departments, libraries, and other special districts.

Impacts on local tax collection would be expected to be substantially lower under Alternative F and lower still under the remaining Alternatives and the Proposed Plan, relative to Alternative A.

4.20.4 Social Impacts

Impacts from Management Actions Affecting Migration

Population

The decrease in employment opportunities in the Study Area under Alternative C from the adverse impacts on farming corresponds to approximately 2 percent of the current employment in the Study Area. Compared with the employment in Harney, Lake, and Malheur Counties, where the impact is more likely to be felt, the adverse impact corresponds to almost 5 percent of the current employment. As shown in **Chapter 3**, of these three counties, Malheur experienced the most population growth from 1990 to 2010 (20 percent) and Harney the least (5 percent). This decrease in employment opportunities could impact the capacity of parts of the Study Area to attract and retain its labor force, with possible consequences for population growth. The impact may be larger in individual communities within those counties. Impacts may also be felt under Alternative F, although to a lesser degree.

Housing and Public Services

Although reductions in employment opportunities could affect population, under no alternatives would population be increased. This means that the alternatives would not affect housing demand in a way that could be adverse for most populations in the area. Demand for public services also would not increase, for the same reason. Under Alternatives C and F, the abilities of counties to supply public services could be reduced in accordance with potential reductions in local tax revenues.

Impacts from Management Actions Affecting Specific Groups and Communities

Consistency with County Land Use Plans

The decision under consideration may result in amended BLM management and LUPs throughout Study Area. The BLM management and LUPs must be consistent with state and local LUPs to the extent possible, and any amendments would aim to maintain this consistency. This would be the case under all alternatives. In public comments to the Draft LUPA/EIS, some counties

were of the opinion that restrictions to uses of public lands could conflict with goals of local LUPs.

Interest Groups and Communities of Place

As described in **Chapter 3**, there is a range of interest groups in the Study Area with overlapping and divergent interests. Groups centered on grazing, land development, infrastructure development, wind and geothermal energy development, conservation of natural resources, and business development generally would be impacted differently by the management alternatives. Also, as described in Chapter 3, groups of interests are defined not just by the economic activity associated with use of BLM lands, but also by the value attributed to BLM lands, often nonmarket values⁸. Within these interest groups, there are more specific ones that could be particularly affected. Among the interest groups most likely to be affected by the choice of alternative are those associated with livestock grazing, wind and geothermal resource exploration and development, infrastructure development, mining, wildlife conservation, recreationists who desire unobstructed cross-country travel in motorized vehicles (not limited to existing routes), and recreationists who could benefit from additional protections to GRSG habitat, such as low-density backcountry camping, or could be harmed by restrictions on Grater Sage-Grouse habitat, such as rockhounding groups.

Among alternatives, Alternative C would generate the greatest impacts. Conservation interests would be expected to benefit most from Alternative C. However, use of BLM-administered lands for income generation and in support of traditional livelihoods would be adversely affected. Grazing interests and communities associated with grazing in Lake, Malheur, and Harney Counties would be expected to be particularly affected. As previously noted, some of these communities could face increased difficulties in attracting and retaining their labor force. As noted in **Section 4.20.5**, Environmental Justice Impacts, these impacts would be expected to disproportionately affect low-income populations. The extent to which these impacts on the livelihoods of low-income populations would have effects on the social fabric of communities in these three counties (e.g., through increased social conflict or decreased social cohesion of individual communities) is not possible to determine based on the information available at this time.

Specific communities would not be impacted in the same way by the management alternatives. Communities with more diversified economies, particularly those less dependent on livestock grazing, would likely be less impacted than those that depend heavily on grazing. For instance, communities where the economy is based on tourism, agricultural crops (but not livestock),

⁸ Wulforth et al (2006) describe how different groups associate with public lands in neighboring Owyhee County (Idaho) in different ways and compete with each other to define the value of public lands in Owyhee County based on their own sense of place.

or activities unrelated to natural resources or public lands would be relatively unaffected by any of the management alternatives.

The BLM reviewed the scoping report to identify any comments related to specific communities that may be particularly affected by various management alternatives (BLM and Forest Service 2012). Several comments highlighted concern with impacts on livestock grazing in Harney and Malheur Counties. Some commenters raised the possibility of adverse impacts on wind energy development. Public comments to the Draft LUPA/EIS expressed more generally that the analysis done in the Draft LUPA/EIS was “piecemeal” and did not allow for a comprehensive understanding of the potential impacts of management alternatives on individual communities. Some comments from county representatives, for example, noted that impacts on one family can sometimes affect entire rural communities, through closure of local facilities such as schools, which serve as gathering places for rural communities. A similar concern was expressed by business associations who referred to Oregon’s experience in the 1990s, when steps were taken to protect the habitat of the Northern Spotted Owl. After the threatened listing of the spotted owl, the availability of federal timber would have been reduced and communities would have suffered with loss of jobs and increase in harmful social conditions such as alcoholism and abuse, affecting the dignity and respect of communities and families.

As previously noted, the BLM recognizes that impacts on individual communities may differ considerably, particularly under Alternative C, and to a lesser extent under Alternative F, because these are the two alternatives under which socioeconomic impacts would most likely be felt. Because the main source of socioeconomic impacts under these two alternatives would be restrictions to the use of BLM managed lands for livestock grazing, the communities mostly likely impacted would be communities dependent on these activities and where BLM managed lands have considerable overlap with GRSG habitat. As previously noted, the counties where these impacts are expected to be the greatest are Lake, Harney, and Malheur.

BLM analyzed data from the U.S. Census Bureau 2007-2011 5-year American Community Survey on employment by broad industrial sectors available at the zip code geographic level (U.S. Census Bureau. 2011). Several communities in Lake, Harney, and Malheur Counties depend on natural resources (agriculture, forestry, fishing, hunting and mining) for over 50 percent of total employment. Comparing the location of these communities with that of GRSG habitat, BLM noted that several of these communities are next to considerable public land with GRSG habitat. These include communities such as Adel, Plush, Silver Lake, and Christmas Valley in Lake County; Frenchglen and Drewsey in Harney County; and Westall in Malheur County. Under Alternative C, and to a lesser extent under Alternative F, communities such as these, highly dependent on livestock operations using federal lands with GRSG habitat for grazing, could

experience broad adverse socioeconomic impacts derived from the reduction in traditional sources of income.

Summary of Social and Economic Impacts

Alternative actions evaluated in this EIS consist of different packages of conservation measures that include land use restrictions, management practices or design features, habitat priorities or desired conditions, and monitoring protocols. These conservation measures, in aggregate, are intended to address threats to, and provide protection for GRSG (see Chapter 2 of this FEIS). This section has evaluated the social and economic impacts resulting from conservation measures that address threats associated with specific land and resource uses (e.g., grazing, minerals) which are linked to social and economic conditions (e.g., employment). There are other conservation measures included in the alternatives (to varying degrees) that address other threats such as fire, invasive plants, and vegetation (e.g., pinyon-juniper) encroachment on GRSG habitat that would have direct impacts on local economies of communities. However, the extent of these impacts is not known at this planning stage and due to uncertainty (e.g., occurrence of fire). Therefore, while the regional economic impact of these conservation measures were not evaluated in this section, they would not only play a critical and complementary role in helping meet the goal of effectively protecting GRSG from a full spectrum of threats, but also support local economic activity.

The discussion and tables below summarize the range of potential social and economic impacts that may occur as a result of the subset of conservation measures that affect land or resource uses linked to readily identifiable social or economic conditions.

Table 4-50, Average Annual Impact on Employment and Earnings by Alternative, Compared with Alternative A, provides a summary of potential effects of management alternatives on employment, earnings, and employment in the Study Area. Alternative A represents impacts associated with current management. The differences shown in the table are derived from summing the estimated reductions for each alternative related to livestock grazing (using the midpoint of the low and high scenarios), and related to geothermal and wind energy development (using both construction and operations impacts in year 5). Although the quantitative analysis includes only earnings and employment affected by management impacts on grazing, geothermal exploration and development, and wind energy development, these activities capture the majority of the economic impact of the alternatives.

Table 4-50
Average Annual Impact on Employment and Earnings by Alternative, Compared with Alternative A

		Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Employment relative to Alternative A (jobs)	Grazing	0	-1,062	-3	0	-375	-1
	Geothermal	-80	-176	0	-80	-176	-83
	Wind	-60	-60	0	0	-60	-60
	Total	-140	-1,298	-3	-80	-613	-144
Earnings relative to Alternative A (2010\$ millions)	Grazing	\$0	-\$34	-\$0.09	\$0	-\$12	-\$0.03
	Geothermal	-\$4	-\$8	\$0	-\$4	-\$8	-\$4
	Wind	-\$3	-\$3	\$0	\$0	-\$3	-\$3
	Total	-\$6	-\$44	\$0	-\$4	-\$23	-\$7
Average Earnings Per Job Lost (2010\$)	Grazing	N/A	\$31,679	\$32,324	N/A	\$31,634	\$30,946
	Geothermal	\$46,405	\$46,419	N/A	\$47,942	\$46,419	\$46,209
	Wind	\$44,690	\$44,690	N/A	N/A	\$44,690	\$44,690
	Total	\$45,670	\$34,279	\$32,324	\$47,942	\$37,157	\$45,470

Source: Impacts calculated using the IMPLAN model as explained in the text and **Appendix R**.

Notes: For grazing impacts, the mid-point between the low impact and high impact scenarios is shown; for geothermal and wind energy, impacts for year 5 are shown and sum the estimated impacts of construction and operations activities in that year.

The analysis shows that reductions in economic employment and earnings would be greatest under Alternative C and F, and there would also be reductions under Alternatives B, D, E and the Proposed Plan. The reductions in Alternative C would correspond to approximately 2.1 percent of total 2010 employment in the Study Area (1,298 out of 62,234 jobs, per **Table 3-57**). Reductions in Alternative F would correspond to approximately 1.0 percent of 2010 employment in the Study Area.

In Alternative B, the reductions are due to reductions in wind energy development and geothermal development. Harney County could be particularly affected because it is a potential location for both wind energy and geothermal development.

In Alternative C, over 80 percent of the reductions would be due to reductions in livestock grazing; these impacts would be expected to be felt to a considerable extent in Lake, Harney and Malheur Counties.

In Alternative D, the magnitude of the impacts would be the least, after Alternative A and attributed to reductions in livestock grazing.

The reductions in Alternative E would be attributed to reductions in geothermal development and could presumably occur throughout the Study Area.

Alternative F would have the second largest reductions in employment and earnings relative to Alternative A. Impacts would be distributed among grazing, geothermal development and wind energy development, but over 60 percent of impacts would be due to grazing.

Under the Proposed Plan, the reductions are mostly due to reductions in wind energy development and geothermal development, with some impact from grazing. As in Alternative B, Harney County could be particularly affected because it is a potential location for both wind energy and geothermal development.

Some differences among the alternatives cannot be quantified. Among these are impacts on locatable and salable minerals, land authorizations such as power lines, and state and local tax revenues. Because tax revenues are largely tied to economic output and earnings, the relative magnitude of impacts on local and state governments across alternatives, and geographic areas, would be consistent with the impacts on employment and earnings presented above. In this respect the comparisons of expected impacts on current conditions are probably most useful for understanding the impacts on tax revenues in the context of other (unaffected) existing and anticipated future revenues.

Management under Alternatives B, C, D, E, F, and the Proposed Plan—and especially Alternatives C and F—could have the effect of limiting the attraction and retention of population in the Study Area. These impacts would not be homogeneous throughout the Study Area, but would be concentrated in specific communities where GRSG habitat intersects with resources important to employment opportunities.

Communities with strong interest groups focused on livestock grazing or geothermal and wind energy development would likely experience adverse impacts from Alternatives B, C, D, E, F, and the Proposed Plan, but especially from Alternatives C and F. Impacts on grazing and geothermal development are likely to be of importance to most counties in the Study Area.

Table 4-51, Social Impacts Relative to Alternative A, summarizes the social impacts of the management alternatives.

Table 4-51
Social Impacts Relative to Alternative A

	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Population growth; demand for housing and public services	Between A and the Proposed Plan	Potential impacts on specific communities	Between A and E	Between A and B	Between A and C	Impacts slightly greater than B
Consistency with county LUPs	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Impacts on interest groups and communities of place	Between A and the Proposed Plan	Most benefits to conservation groups; adverse impacts on grazing interests	Most benefits to energy interests	Between A and B	Between A and C; adverse impacts on grazing interests	Slightly greater than B

Non-market benefits from the management alternatives would be derived from the ability of the full spectrum of conservation measures to conserve, enhance, and/or restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. The magnitude of benefits associated with stabilizing or improving GRSG populations or habitat has not been monetized or quantified due to the absence of specific data on the values of non-market benefits of GRSG and uncertainty about quantifying projected responses of GRSG habitat and populations to conservation measures.

A qualitative evaluation of the benefits from potential changes in GRSG populations and habitat resulting from the subset of conservation measures addressing land and resource uses and extraction, as evaluated in this section, indicates the alternatives have the following capability to protect or improve benefits from GRSG:

- Alternative A has the lowest capability.
- Alternative B has greater capability than A, but lower capability than the Proposed Plan.
- Alternative C has the greatest capability.
- Alternative D has the second lowest capability after Alternative A.
- Alternative E has greater capability than Alternative A or D but less than B, C, F or the Proposed Plan.
- Alternative F has second greatest capability after Alternative C.
- The Proposed Plan has greater capability than A, B, D or E, but less than C or F.

In addition to the conservation measures directly associated with social or economic impacts considered in this section, there are other conservation measures that address other threats (e.g., fire, nonnative plants, encroachment) that contribute to GRS habitat protection and corresponding benefits that are not addressed here. As a consequence, for a complete description of potential improvements in GRS habitat protection resulting from the full spectrum of conservation measures under each alternative, the reader is referred to the effects summary tables provided in Chapter 2. Social and economic impacts cannot be considered in isolation or exclusive of other impact indicators discussed in this EIS.

4.20.5 Environmental Justice Impacts

The BLM considered information on the presence of minority and low-income populations (from **Chapter 3**), along with additional information described in this section, to assess the potential for the alternatives to have disproportionately high and adverse impacts on minority or low-income populations. Although conservation measures would be implemented consistently across all identified habitat, with no discrimination over particular populations, environmental justice guidance requires agencies to consider also whether their actions could unintentionally result in disproportionately high and adverse effects.

To help guide the analysis of potential environmental justice impacts, the BLM considered the information gathered in the Economic Strategies Workshop that was conducted in June 2012. That workshop was convened to identify public concerns related to potential social, economic, and environmental justice impacts that could result from the management alternatives. None of the public comments received during that workshop called out a specific concern related to minority populations.

The BLM also reviewed the scoping report to identify any comments related to environmental justice issues received in the scoping phase. One commenter identified the need to examine exploitation of poor workers, including workers on foreign visas, for work on sheep ranching and other cattle ranching on BLM-administered lands. (This comment was not specific for Oregon but for all sub-regions considering GRS habitat conservation measures.) No other comments during the scoping period were identified raising concerns regarding potential impacts on minority and low-income populations.

Potential Impacts on Minority Populations

As discussed in **Chapter 3**, CEQ guidance identifies a community or a specific population group as a minority population when either minority populations in the affected area exceed 50 percent of the total population or if the percentage of minorities in the affected area is meaningfully greater than the percentage in the general population or appropriate unit of geographical analysis. Based on the description of minority presence in the primary study area in **Chapter 3**, and

based on definitions in relevant guidance, the BLM considers Malheur County to have a concentration of a minority population. In Malheur County, Hispanics are represented in almost three times the proportion of Oregon as a whole, roughly 20 percentage points more than in the state. Hispanics represent almost a third of the total population of Malheur County. Total minority presence in that county is also over 50 percent higher than in the state. Given its large geographic coverage, the primary Study Area may contain smaller communities, where minority presence is meaningfully greater than in the state as a whole. This is not identified in **Chapter 3**. In addition, the two tribes present in the Socioeconomic Study Area (Burns Paiute in Harney County and Fort McDermitt Paiute and Shoshone in Malheur County) and the two tribes with traditional interests in the Socioeconomic Study Area (Confederate Tribes of the Warm Springs Reservation and Klamath Tribes) were also considered.

The extent to which existing minority populations are disproportionately impacted by high and adverse human health or environmental effects depends on two factors: the existence of high and adverse human health or environmental effects from management alternatives on any of the resources analyzed, and whether minority populations are particularly vulnerable to these impacts or more likely to be exposed to such impacts.

Adverse impacts of alternatives were identified under the various resources analyzed and are described in their respective sections of **Chapter 4**.

- Adverse impacts under any of the alternatives would not be restricted to one community or small communities but would be spread out in a broad region.
- No minority group is identified with the specific collection of activities that could be impacted by GRSG management (e.g., grazing).
- No pathways were identified through which minority populations would be particularly vulnerable to the adverse impacts identified in Chapter 4.

The BLM concluded that there would be no disproportionately high and adverse impacts on minority populations under the management alternatives considered.

Potential Impacts on Low-Income Populations

The presence or absence of low-income populations in the primary Study Area is discussed in **Chapter 3**. Of the seven counties in the Socioeconomic Study Area, all but one have a greater percentage of residents below the poverty level than the state's 14.0 percent. Crook County (14.0 percent) has the same percentage of residents below the poverty level as Oregon as a whole. Grant County has almost the same, at 14.4 percent. Malheur County (22.7 percent) has the highest percentage of residents below the poverty level. The percentage of Baker County (19.9 percent), Harney County (18.5 percent), Lake County

(17.5 percent), and Union County (16.1 percent) residents below the poverty level are also higher than Oregon as a whole. For the purposes of this EIS, the BLM considers Malheur, Baker, Harney, Lake, and Union Counties to be low-income communities.

The BLM reviewed the impacts of alternatives described in the respective sections of **Chapter 4**. It identified impacts on grazing in Malheur, Lake, and Harney Counties under Alternatives C and F to be high and adverse and to disproportionately impact low-income populations. This conclusion was based on the share of farm employment in those counties that could be affected by Alternatives C and F, and the fact that the three counties where impacts would most likely be concentrated were all low-income populations. Adverse impacts from management alternatives through mining, geothermal development, wind energy development, or ROW restrictions could occur but would not be considered to be high and adverse, based on review of the various resource impact sections.

Table 4-52
Environmental Justice Impacts

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Proposed Plan
Disproportionately high and adverse impacts on minority populations	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Disproportionately high and adverse impacts on low-income populations	No Impact	No Impact	Disproportionately high and adverse impact related to employment and earnings from ranching and grazing (Lake, Harney, and Malheur)	No Impact	No Impact	Disproportionately high and adverse impact related to employment and earnings from ranching and grazing (Lake, Harney, and Malheur)	No Impact

4.21 UNAVOIDABLE ADVERSE IMPACTS

Section 102(c) of NEPA requires disclosure of any adverse environmental impacts that could not be avoided should the RMPA be implemented. Unavoidable adverse impacts are those that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. Some unavoidable adverse impacts occur as a result of implementing the RMPA. Others are a result of public use of BLM-administered lands within the planning area. This section summarizes major unavoidable impacts discussions of the impacts of each management action (in the discussion

of alternatives) and provides greater information on specific unavoidable impacts.

Permanent conversion of areas to other uses, such as transportation and mineral and energy development or OHV use, would be unlikely under all of the action alternatives, however, the scope, scale, and location allowed varies by alternative. These would most likely increase erosion and decrease the relative abundance of species within plant communities, the relative distribution of plant communities, and the relative occurrence of seral stages of those communities. These activities would also intrude on the visual landscape. This type of development is most likely to occur under Alternative A. The other action alternatives place many restrictions on many types of development, which would most likely result in fewer visual intrusions and fewer instances of unavoidable wildlife habitat loss.

Unavoidable damage to cultural resources from permitted activities could occur if resources undetected during surveys were identified during surface-disturbing activities. In these instances, further activity would cease on discovery of a cultural resource, and mitigation measures would be implemented to minimize damage or loss. This scenario is most likely to occur under Alternative A because it would place the fewest restrictions on surface-disturbing activities. Unavoidable loss of cultural resources would also occur, due to them not being recognized, lack of information and documentation, erosion, casual collection, and inadvertent destruction or use. Broad-scale sampling and classification of areas with a high likelihood of containing cultural and resources would be expected to greatly reduce the probability of unavoidable adverse impacts on the resource.

Wildlife, livestock, and wild horses as well as other herbivores consume vegetation and impact soils through hoof action and possible compaction. When these impacts are kept at appropriate levels, natural processes such as plant growth and recovery and microbial activity in the soil surface result in recovery from these impacts and maintain site stability and health. Vegetative treatments promoting recovery of GRSG would result in the destruction of the target species, be it invasive plants, encroachment of juniper, or changes in the structural classes of a sagebrush stand. Some level of competition for forage between these species, although mitigated to the extent possible, would be unavoidable. Instances of displacement, harassment, and injury could also occur. These types of scenarios are most likely to occur under Alternative A. The action alternatives would place restrictions on many development and surface-disturbing activities, which would make the likelihood that displacement, harassment, and injury would occur to be much lower than Alternative A.

Recreation, development of mineral resources, and general use of the decision area would introduce additional ignition sources into the planning area, which would increase the probability of wildfire and the need for its suppression.

These activities, combined with continued fire suppression, would also affect the overall composition and structure of vegetation communities; this could increase the potential for high-severity wildfires. Restrictions on development under all of the action alternatives would be expected to decrease the potential for ignitions in the decision area.

As recreation demand increases, recreation use would disperse, creating unavoidable conflicts between recreation users, such as those seeking more primitive types of recreation, and motorized users sharing recreation areas. In areas where development would be greater, the potential for displaced users would increase. Under all of the action alternatives, restrictions on development would be expected to reduce the potential for displaced recreational users.

Numerous land use restrictions imposed throughout the decision area to protect GRS habitat and other important values affect the ability of operators, individuals, and groups who use the BLM-administered lands to do so without limitations. Although attempts would be made to minimize these impacts, unavoidable adverse impacts in the number and miles of roads or trails available for recreational use could occur under all of the action alternatives. Minimization would include limiting restrictions to the level of protection necessary to accomplish management objectives and providing alternative use areas for affected activities.

4.22 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Section 102(2)(c) of NEPA requires a discussion of any irreversible or irretrievable commitments of resources that would be involved in the RMPA should it be implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., extraction of any locatable mineral ore or oil and gas). An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or loss of a cultural resource site without proper documentation).

Implementation of the RMPA management actions for all alternatives, except Alternative A, would result in fewer surface-disturbing activities, including mineral, energy, and ROW development, that result in loss of irreversible or irretrievable resources.

Although new soil can develop, it is a slow process. Soil erosion or the loss of productivity and soil structure might be considered irreversible commitment to resources. Surface-disturbing activities, therefore, would remove vegetation and accelerate erosion, which would contribute to irreversible soil loss. However, many of the management actions in the RMPA are intended to reduce the magnitude of these impacts and to restore some of the soil and vegetation lost. Such disturbances would occur to the greatest degree under Alternative A, which would allow many more surface-disturbing activities, compared with the action alternatives.

Development of mineral resources (e.g., oil, gas, sand, and gravel) is irreversible. If these nonrenewable resources were extracted for consumption or use, they would be irreversibly removed. BLM Handbook H-1624-1, Planning for Fluid Minerals, acknowledges leasing of oil and gas resources as an irreversible commitment. As noted above, this would be most likely under Alternative A.

4.23 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Section 102(c) of NEPA requires discussion of the relationship between local, short-term uses of the human environment and the maintenance and enhancement of long-term productivity of resources. As described in the introduction to this chapter, short term is defined as anticipated to occur within the first 5 years of implementation of the activity; long term is defined as following the first 5 years of implementation but within the life of the RMPA.

Management actions would result in various short-term impacts, such as increased localized soil erosion, fugitive dust emission, and vegetation loss or damage, and decreased visual resource quality. These impacts would be expected primarily under Alternative A, which would allow the most surface-disturbing activities.

Other surface-disturbing activities, including transportation and utility corridor construction and mineral resource development would result in the greatest potential for impacts on long-term productivity. Management prescriptions and reasonably foreseeable development scenarios are intended to minimize the effect of short-term commitments and to reverse changes over the long term. These prescriptions and the associated reduction of impacts would be greatest under Alternative C, with Alternative F close behind for such resources as vegetation and wildlife habitat. However, some impacts on long-term productivity might occur, despite the prescriptions intended to reduce impacts on GRSG habitat.

ROW authorizations and short-term use of an area to foster energy and minerals would result in long-term loss of soil productivity and vegetation diversity. Impacts would persist as long as surface disturbance and vegetation loss continue. In general, the loss of soil productivity would be directly at the point of disturbance; even so, long-term vegetation diversity and habitat value could be reduced due to fragmentation and the increased potential for invasive plants to spread from the developments or disturbances. Alternative A would have the greatest potential for short-term loss of productivity and diversity due to the high level of potential development and the lack of stringent mitigation and reclamation standards contained in Alternatives B, C, D, E, and F and the Proposed Plan. Alternative C would provide the greatest long-term productivity by excluding development in many areas through closures or application of severe restrictions on development.

ROWs and the short-term use of GRSG habitat for energy and minerals could impair the long-term productivity of GRSG populations. This would happen by displacing animals from primary habitats and removing components of these habitats that might not be restored for more than 20 years. These short-term uses could also affect the long-term sustainability of some special status species. The potential for these impacts would vary by alternative because long-term deterioration of GRSG habitat as a result of mineral activity would be more evident under Alternative A. The short-term resource uses associated with travel, transportation, and mineral development (e.g., individual short OHV trips, oil and gas seismic exploration, natural gas test well drilling, and the noise associated with these activities) would have adverse impacts on the long-term productivity of GRSG populations. This would be the case if these resource uses were to infringe on GRSG winter habitat, breeding and brood-rearing habitat, and summer habitat. These activities, though short-term individually, could have collective long-term impacts on GRSG productivity and health if they were to increase in the long term.

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Chapter 5

Cumulative Effects

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CHAPTER 5

CUMULATIVE IMPACTS

5.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

Changes to this chapter between the Draft EIS and Final EIS are as follows:

- Updated analyses as a result of reviewing additional literature, revised acreages from updated data, and revised or new appendices
- Updated **Table 5-23**, Reasonably Foreseeable Future Actions
- Replaced DEIS discussion of cumulative impacts on GRSG with an analysis focused on cumulative impacts on GRSG at the WAFWA management zone level
- Updated, as appropriate, based on public comments received on the DEIS

5.2 CUMULATIVE IMPACTS

This section presents the likely cumulative impacts on the human and natural environment that could occur from implementing the alternatives presented in **Chapter 2**, Alternatives. This section is organized by topic, similar to **Chapter 3**, Affected Environment.

Cumulative impacts are effects on the environment that result from the impact of implementing any one of the Oregon Greater Sage-Grouse RMPA/EIS alternatives. These effects are in combination with other actions outside the scope of this plan, either within the planning area or next to it. Cumulative impact analysis is required by CEQ regulations because environmental conditions result from many different factors that act together. The total effect of any single action cannot be determined by considering it in isolation but must be determined by considering the likely result of that action in conjunction with many others.

The evaluation of potential impacts considers incremental impacts that could occur from the proposed project, as well as impacts from past, present, and reasonably foreseeable future actions. Management actions could be influenced by activities and conditions on adjacent public and non-public lands beyond the planning area boundary; therefore, assessment data and information could span multiple scales, landownerships, and jurisdictions. These assessments involve determinations that often are complex and, to some degree, subjective.

5.3 GREATER SAGE-GROUSE CUMULATIVE EFFECTS ANALYSIS: OREGON SUB-REGION

This cumulative effects analysis (CEA) discloses or estimates the long-term effects on GRSG and its habitat from implementing each RMPA/EIS alternative, in conjunction with other past, present, and reasonably foreseeable future actions. In accordance with Council of Environmental Quality guidance, cumulative effects need to be analyzed in terms of the specific resource and ecosystem being affected (Council of Environmental Quality 1997). As discussed in Chapter 1, the purpose for the proposed federal action is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. The Western Association of Fish and Wildlife Agencies (WAFWA) delineated seven sage-grouse management zones based on populations within floristic provinces (Stiver et al. 2006). Therefore, the cumulative effects analysis area for GRSG extends beyond the Oregon sub-region boundary and incorporates WAFWA Management Zones (MZ) V and IV.

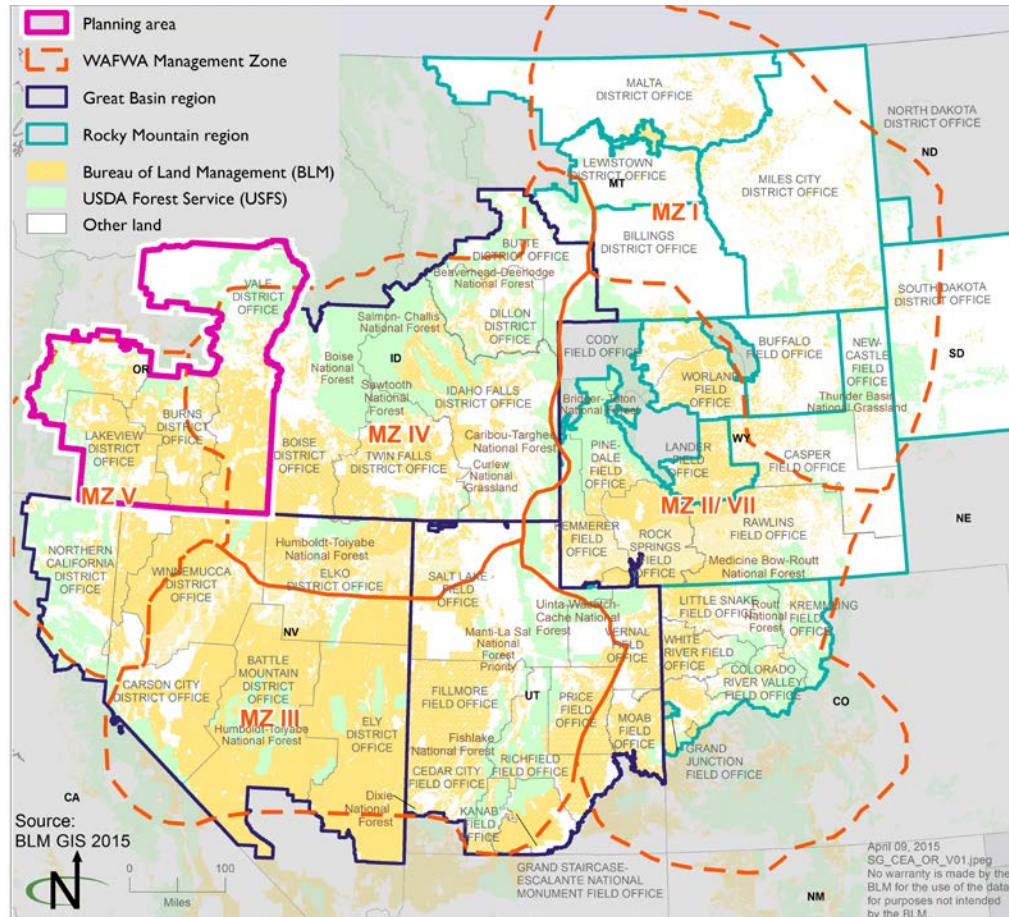
As indicated in the DEIS, the CEA for the FEIS includes quantitative analysis where possible. The analysis of BLM actions in MZs V and IV is primarily based on MZ-wide datasets developed by the BLM National Operations Center (NOC). Where quantitative data are not available, analysis is qualitative. This analysis includes past, present and reasonably foreseeable future actions for all land ownerships in the MZ, and evaluates the impacts of the Nevada and Northeastern California LUPA, by alternative, when added to those.

The analysis of nonfederal lands and actions includes a review and analysis of the following:

- State plans
- Coordination with states and agencies during consistency reviews
- Additional data from non-BLM-administered lands

The following diagram shows the boundaries of the WAFWA MZs and the BLM and Forest Service Sub-regions. The Oregon Sub-region contains relatively little priority habitat management areas (PHMA) and general habitat management areas (GHMA) (**Chapters 1 and 2** contain an explanation of PHMA and GHMA) compared to the total PHMA and GHMA within MZ IV (3,300,400 acres of PHMA out of 22,105,600 total acres in MZ IV; and 3,095,600 acres of GHMA out of 10,128,500 total acres in MZ IV). The remaining PHMA and

GHMA within MZ IV are contained within three other sub-regions, including the Idaho and Southwestern Montana sub-region which is by far the largest within MZ IV. As a result, actions in the Oregon sub-region may have a relatively small cumulative impact in terms of number of acres and population of GRSG compared to those actions in other, larger sub-regions within MZ IV, particularly the Idaho and Southwestern Montana sub-region.



In contrast to MZ IV, the Oregon sub-region contains approximately half of the PHMA and most of the GHMA within MZ V (3,256,100 acres of PHMA out of 7,289,000 total acres in MZ V; and 5,124,900 acres of GHMA out of 5,759,900 total acres in MZ V). The remaining PHMA and GHMA within MZ V are within the Nevada and Northeastern California sub-region, the only other sub-region within MZ V. As a result, actions in the Oregon sub-region within PHMA may have a similar cumulative impact on GRSG compared to those actions in the Nevada and Northeastern California sub-region. Actions in the Oregon sub-region within GHMA will likely have a much greater cumulative impact in terms of number of acres and population of GRSG compared to those actions in the Nevada and Northeastern California sub-region in GHMA.

Section 5.3.1, Methods, provides a description of the methodology used for this cumulative effects analysis. **Section 5.3.2** lists assumptions used in the

analysis. **Section 5.3.3** describes existing conditions in WAFWA MZ V and in the Oregon sub-region. **Section 5.3.4** provides a broad-scale description of regional efforts to manage GRSG habitat in MZ V. **Section 5.3.5** discusses the relevant cumulative actions in MZ V that will be analyzed in this CEA. **Section 5.3.6** analyzes threats to GRSG and its habitat in MZ V and discusses the potential cumulative effects resulting from each threat for each alternative. **Section 5.3.7** describes existing conditions in WAFWA MZ IV. **Section 5.3.8** provides a broad-scale description of regional efforts to manage GRSG habitat in MZ IV. **Section 5.3.9** discusses the relevant cumulative actions in MZ IV that will be analyzed in this CEA. **Section 5.3.10** analyzes threats to GRSG and its habitat in MZ IV and discusses the potential cumulative effects resulting from each threat for each alternative. **Section 5.3.11**, Conclusions, determines the cumulative effects on GRSG and its habitat as a result of implementing each alternative in combination with other private, local, regional, state, and federal past, present, and reasonably foreseeable future actions in MZs V and IV. **Section 5.3.12** lists a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZs V and IV.

5.3.1 Methods

The CEA uses the following methods:

- Data from the USGS publication Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013) establishes the reference condition against which the alternatives and other past, present, and reasonably foreseeable future actions are compared. Data from this publication are presented in terms of priority habitat and general habitat.
- The USFWS's 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (USFWS 2010) and the USFWS publication Conservation Objectives: Final Report (i.e., the COT report; USFWS 2013a) were reviewed to identify the primary threats facing GRSG in each WAFWA MZ. Table 2 of the COT report lists threats to GRSG that are present and widespread in each population in the MZ.
- For MZs IV and V, the lists of threats to GRSG that are directly or indirectly affected by BLM and Forest Service actions include: wildfire, spread of invasive plants with annual grasses of particular concern, conifer encroachment, infrastructure development, livestock grazing and free-roaming equids, conversion of land to agriculture uses/urbanization, energy development, mining, and recreation (USFWS 2013a, pp. 25-26). Two other threats listed in the COT report, sagebrush eradication and isolation/small

population size, affect GRSG populations in MZs IV and V. While they are not addressed separately in this analysis, they are discussed as elements of other threats.

- Predation was not included as a threat in the final COT report and was not identified by USFWS as a significant threat to GRSG populations (USFWS 2010). Predation is a natural occurrence that may be enhanced by human habitat modifications such as construction of infrastructure that may increase opportunities for nesting and perching or increase exposure of GRSG nests. In such altered habitats, predators may exert an undue influence on GRSG populations. Predation is discussed in this CEA in the context of these other threats.
- Sagebrush eradication is a component of many threats. Isolation/small population size is not analyzed separately, because no management actions directly address this threat. These two threats are discussed as a component of other threats, and in the conclusions. Not all the threats discussed in this section represent major threats to GRSG in each sub-region in the MZ, but each poses a present and widespread threat to at least one population.
- Each threat is analyzed, and a brief conclusion for each threat is provided.
 - The BLM NOC compiled MZ-wide datasets for quantifiable actions in all proposed BLM RMPAs/LUPAs in MZs IV and V. These datasets provide a means by which to quantify cumulative impacts resulting from direct impacts of the threats identified in the COT report.
 - Data and information were gathered from other federal, state, and local agencies and tribal governments, where available, and were used to inform the analysis of cumulative impacts on GRSG from each of the threats in MZs IV and V.
 - The tables in this cumulative analysis display the number of acres across the entire MZ and the percentage of those acres that are located within the Oregon Sub-region. To calculate the total number of acres in the MZ, the number of acres in the other BLM and Forest Service proposed plans across the MZ are added to the number of acres in the applicable Oregon RMPA alternative. For example, the total number of acres for Alternative A includes all of the other proposed plans in the MZ plus Oregon RMPA Alternative A.
- A discussion is provided for each alternative in **Section 5.3.II**. Each alternative considers the cumulative impacts on GRSG from each of the threats. It also considers whether those threats can be

ameliorated by implementing that particular alternative in conjunction with past, present, and reasonably foreseeable non-BLM actions in MZs IV and V.

- The lists of relevant cumulative actions in **Sections 5.3.5** and **5.3.9** were derived from each proposed BLM RMPA/LUPA in MZs IV and V to provide an overview of the ongoing and proposed land uses there.
- Baseline data that are consistent across Sub-regions and that analyze cumulative effects for each alternative, including the No Action Alternative and Proposed Plan, are used in this analysis.
- This analysis uses the most recent information available. For purposes of this analysis, the BLM has determined that the Proposed Plans for the other ongoing GRSG planning efforts in MZs IV and V are reasonably foreseeable future actions.
- PHMA and GHMA were developed to protect the best habitat and highest population density of GRSG. Although Alternative A does not designate PHMA or GHMA, spatial GIS data were clipped to these boundaries to allow for a consistent comparison across all alternatives.

5.3.2 Assumptions

This cumulative analysis uses the same assumptions and indicators as those established for the analysis of direct and indirect effects on GRSG as discussed in **Section 4.2.1**. In addition, the following assumptions have been made:

- The timeframe for this analysis is 20 years.
- The CEA area extends beyond the sub-region and encompasses all of WAFWA MZs IV and V; the quantitative impact analysis focuses on impacts across the MZ. The MZ is the appropriate scope for this analysis because it encompasses areas with similar floristic conditions containing important GRSG habitat.
- The magnitude of each threat to GRSG would vary geographically and may have more or less impact on GRSG and its habitat in some parts of the MZ, depending on such factors as climate, land use patterns, and topography.
- All acres in this analysis are presented by PHMA and GHMA, consistent with the analysis of direct and indirect impacts earlier in this EIS. The exception to this is quantitative data for the Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013), which used Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) to describe GRSG habitat.

Where Manier et al. (2013) data are used in this CEA, “priority habitat” refers to PPH and “general habitat” refers to PGH.

- A management action or alternative would result in a net conservation gain to GRSG if there is an actual benefit or gain above baseline conditions. Baseline conditions are defined as the pre-existing condition of a defined area and/or resource that can be quantified by an appropriate metric(s). During environmental reviews, the baseline is considered the affected environment that exists at the time of the review's initiation, and is used to compare predictions of the effects of the Proposed Plan or the effects of a reasonable range of alternative actions.
- The CEA quantitatively analyzes impacts on GRSG and their habitat in the MZ. Impacts on threats to GRSG habitat are likely to correspond to impacts on threats to GRSG populations within the MZ, since reductions or alterations in habitat could affect reproductive success through reductions in available cover, forage or nest sites. Human activity could cause disturbance to GRSG, preventing them from mating or successfully rearing offspring. Human activities also could increase opportunities for predation, disease, or other stressors (Connelly et al. 2004; USFWS 2010; Manier et al. 2013).

5.3.3 Existing Conditions in WAFWA MZ V and the Oregon Sub-Region

This section summarizes existing conditions and past and present actions for the Oregon Sub-region (provided in more detail in **Chapter 3**) and for MZ V as a whole. Reasonably foreseeable future actions are discussed in **Section 5.3.5**.

GRSG Habitat and Populations

MZ V consists of four GRSG populations: Central Oregon, Klamath, Warm Springs Valley, and Western Great Basin (USFWS 2013a, p. 25-26). The Oregon sub-region contains all or portions of two of these populations, Central Oregon and Western Great Basin. No known occupied portion of Klamath population occurs in Oregon sub-region. The Warm Springs Valley population is located in the southern portion of MZ V, in the Nevada and Northeastern California Sub-region. MZ V represents the westernmost extent of the GRSG range and contains a mix of habitat issues which have had long-term effects on GRSG populations. GRSG leks in MZ V are relatively well-connected (second in connectedness only to the Wyoming Basin; Knick and Hanser 2011); however, the COT Report identifies habitat loss and fragmentation due to wildfire and conifer encroachment as primary threats to GRSG in the MZ (USFWS 2013a).

In MZ V, state and private lands account for over 2 million acres of GRSG habitat (approximately 17 percent of habitat), with BLM-administered and other federal land accounting for over 10.3 million acres of habitat (approximately 80 percent of habitat) (Manier et al. 2013, p. 118). Additionally, BLM-administered

federal mineral estate that may exist with other surface ownership, often referred to as split-estate lands, exists within MZ V. The higher percentage of GRSG habitat on BLM-administered and other federal land means BLM management could play a key role in alleviating threats to GRSG in MZ V.

Table 5-1 provides a breakdown of landownership and acres of GRSG habitat in MZ V. As the table shows, approximately 72 percent of priority habitat and 72 percent of general habitat is on BLM-administered lands. In the Oregon sub-region, there are approximately 12.9 million acres of GRSG habitat, of which approximately 9.3 million acres (72 percent) on BLM-administered lands. The remaining 3.6 million acres (18 percent) of GRSG habitat comprise private, local, state, and other federal and tribal lands. Only a small percentage of priority habitat and general habitat is located on National Forest System lands (less than 1 percent of priority habitat and 2 percent of general habitat in MZ V is on National Forest System lands). As a result, the contribution of National Forest System lands to cumulative effects in MZ V will not be discussed further.

The percentage of BLM-administered surface estate in the sub-region is high. This suggests that BLM actions in the Oregon sub-region may have a greater impact on ameliorating major threats to GRSG than comparable actions on private and state lands.

Table 5-1
Management Jurisdiction in MZ V by Acres of Priority and General Habitats

	Total Surface Area (Acres)	Priority Habitat (Acres)	General Habitat (Acres)	Non-habitat (Acres)
MZ V	36,447,900 (100%)	7,097,200 (19%)	5,808,000 (16%)	23,542,700 (65%)
BLM	14,179,800 (39%)	5,117,500 (72%)	4,196,700 (72%)	4,865,600 (21%)
Forest Service	10,136,000 (29%)	62,200 (<1%)	114,900 (2%)	9,958,900 (42%)
Tribal and other federal	1,964,700 (5%)	717,100 (10%)	101,800 (2%)	1,145,800 (5%)
Private	6,299,000 (17%)	798,000 (11%)	1,199,000 (21%)	4,302,000 (18%)
State	473,600 (1%)	64,900 (<1%)	115,800 (2%)	292,900 (1%)
Other	3,394,700 (9%)	337,500 (5%)	79,800 (1%)	2,977,400 (13%)

Source: Manier et al. 2013, p. 118

Sub-region Habitat Conditions

MZ V is mostly within the Northern Basin and Range Ecoregion (**Figure 3.4**). The topography consists of large and small closed basins, dissected lava plains, rolling hills, alluvial fans, valleys and scattered long linear north-south trending mountain ranges.

Lower elevation valley bottoms often are dominated by non-GRSG habitat including playas and salt desert shrub vegetation, but transition to sagebrush dominated benches as elevation rises. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is the most common big sagebrush subspecies. Lower elevation sagebrush habitats contain the largest area of invasive annual grasses that have altered the characteristic wildfire regime. Pinyon (*Pinus monophylla*)-juniper (*Juniperus* spp.) or juniper woodlands intermingled with cooler, moister sagebrush communities dominate mid-elevation areas; these woodlands then give way to cooler, moister sagebrush communities where conditions are too cold for juniper and pinyon pine. Mountain big sagebrush (*A. t.* ssp. *vaseyana*) is the most common big sagebrush subspecies present, often with antelope bitterbrush (*Purshia tridentata*) as a co-dominant. Wyoming big sagebrush and basin big sagebrush (*A. t.* ssp. *tridentata*) can also be present at the ecotone between the warmer, drier and cooler, moister sites. Low sagebrush species (e.g., *A. arbuscula*, *A. nova*, *A. rigida*) dominates on shallower soils at all elevations but tends to be more common at the lower elevations. Mountain big sagebrush and low sagebrush sites are also forb-rich, particularly when sagebrush cover is relatively low.

Large areas of GRSG habitat in the Management Zone have been substantially altered from natural condition as a result of altered wildfire regimes and spread of invasive plants like cheatgrass (*Bromus tectorum*) and native conifers like piñon pine and juniper. Wildfires are closely linked with invasion and dominance of annual grasses, especially cheatgrass, due to their effect on fuels and fire-return intervals. Annual grass invasion has been widespread in this region for decades, and some former (historic) habitats are likely “unrecoverable” without unreasonable expenditures of cost and time (Manier et al. 2013, pg. 132).

Additionally, past and ongoing human activities have further fragmented or reduced GRSG habitat. Human disturbances include mining and associated infrastructure, roads, transmission lines, and other rights-of-way, renewable energy development and associated infrastructure, grazing development including fences, and agricultural and urban conversion.

Habitat degradation is a complicated interaction among many factors, including drought, unmanaged or improperly managed livestock grazing, changes in natural wildfire regimes, conifer encroachment, and invasive plant species; changes in land use and land development are also causes of habitat loss (Fischer et al. 1996; Pyle and Crawford 1996; Beck and Mitchell 2000; Nelle et al. 2000).

Oregon RMPA Alternatives

The Oregon RMPA/EIS evaluated the following seven alternatives:

- Alternative A, current management (the No Action Alternative)

- Alternative B, which uses GRSG conservation measures in the National Technical Team (NTT) report (NTT 2011) to form management direction
- Alternative C, which emphasizes individual and conservation group recommendations in conjunction with resource allocation opportunities and internal BLM input
- Alternative D, the Oregon BLM Alternative, which generally allows resource use if the activity can be conducted in a manner that conserves physical, biological, heritage, and visual resources
- Alternative E, which uses the Oregon Department of Fish and Wildlife (ODFW) proposed GRSG management described in the report Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat (Hagen 2011)
- Alternative F, which also emphasizes individual and conservation group recommendations; however Alternative F generally provides greater management flexibility than does Alternative C, which generally contains greater restrictions on land management.
- The Proposed Plan, which is based on modifications made to the draft agency-preferred alternative (Alternative D), is based on public comments received on the Draft RMPA/EIS, internal BLM review, new information, and best available science. The Proposed Plan incorporates adaptive management, monitoring, and mitigation for GRSG as described in Chapter 2, as well as incorporation of RDFs, BMPs, and actions specific to leks to further reduce impacts to GRSG habitat from development. The Proposed Plan also incorporates USFWSSFAs.

Nevada and Northeastern California LUPA Alternatives

The Nevada and Northeastern California LUPA/EIS evaluated the following seven alternatives:

- Alternative A, current management (the No Action Alternative)
- Alternative B, which uses GRSG conservation measures in A Report on National Greater Sage-Grouse Conservation Measures (NTT 2011) to form BLM and Forest Service management direction
- Alternative C, which uses individual and conservation group-submitted management recommendations for GRSG and GRSG habitat to form BLM and Forest Service management direction
- Alternative D, the BLM and Forest Service agency-preferred alternative, which emphasizes balancing resources and resource use among competing human interests, land use, and conservation of

natural and cultural resource values, while sustaining and enhancing ecological integrity

- Alternative E, which is based on the State of Nevada's Conservation Plan for GRSG in Nevada (SETT 2014)
- Alternative F, which also uses individual and conservation group-submitted management recommendations for GRSG and GRSG habitat; this alternative differs from Alternative C on issues related to grazing, wild horse and burro management, lands and realty, and minerals.
- The Proposed Plan, which is based on modifications made to the draft agency-preferred alternative (Alternative D), is based on public comments received on the Draft LUPA/EIS, internal BLM review, new information, and best available science. The Proposed Plan incorporates adaptive management, monitoring, and mitigation for GRSG, as well as incorporation of RDFs, and BMPs, to further reduce impacts to GRSG habitat from development.

Population Trends in Management Zone V

Of the seven management zones, MZ V is characterized as one of those supporting the highest densities of GRSG. MZ V consists of three GRSG populations Western Great Basin, Warm Springs Valley, and Central Oregon, and a fourth, small and fragmented population, Klamath (Manier et al., p. 133).

The range of GRSG in MZ V has continued to shrink in extent over the last three decades, while some populations within MZ V are relatively stable. When considered in its entirety, population change from 1965-2004 was statistically undetectable (Connelly et al. 2004), declining by 3.3 percent (Connelly et al. 2004), and by 2 percent (Garton et al. 2011). However, populations in MZ V as a whole declined 65 percent over the 2007 to 2013 period (Garton et al. 2015, p. 19). Garton et al. (2015, p. 19) predicted a 13.6 percent chance that populations within MZ V will fall below 200 males in the short term (by 2045), and a 92.3 percent chance that populations within MZ V will fall below 500 males in the long term (by 2115),

While population estimates and trends for the Oregon sub-region are not available, GRSG populations within the sub-region are described in **Section 3.2**.

5.3.4 Regional Efforts to Manage Threats to GRSG in MZ V

Regional efforts include past, present, and reasonably foreseeable actions conducted by the BLM and by other federal and/or in cooperation with non-federal agencies, organizations, landowners, or other groups in MZ V. These efforts would be applicable on state and private lands in the sub-region, which contain approximately 3.6 million acres (28 percent) of GRSG habitat (Manier et al. 2013, p. 118). The boundaries of MZ V encompass portions of the states of

Oregon, Nevada, and California. Regional efforts occurring in these states are discussed below.

Other BLM and Forest Service Planning Efforts

As part of the Greater Sage-Grouse Range wide Planning Effort, other BLM and Forest Service sub-regions, as explained in Chapter I, are undergoing LUPA/EIS processes similar to this one for the Oregon Sub-Region. The Final EIS associated with each of these efforts has identified a Proposed Plan that meets the purpose and need of conserving, enhancing, and/or restoring GRSG habitat by reducing, eliminating, or minimizing threats. The management actions from the various Proposed Plans will cumulatively decrease the threat of GRSG habitat loss and will limit fragmentation throughout the range. Key actions present in many of the Proposed Plans include changes in land use allocations, a mitigation framework, an adaptive management strategy, anthropogenic disturbance cap, and lek buffers. The cumulative effect of these actions, when added to the direct and indirect effects identified above, will be a reduction in the historic rate of fragmentation and loss of GRSG habitat.

The BLM has incorporated management of Sagebrush Focal Areas (SFA) into its proposed management actions for GRSG and its habitat. SFA are a subset of PHMA and represent recognized “strongholds” for the species that have been noted and referenced by USFWS identified as having the highest densities of the species and other criteria important for the persistence of the species. Those portions of SFA on BLM-administered lands would be recommended for withdrawal from mineral entry, subject to a NSO stipulation with no exceptions, modifications, or waivers, and are prioritized for management and conservation actions, including, but not limited to, review of livestock grazing permits/leases. Management of SFA would enhance protection of GRSG and its habitat in these areas, providing a net conservation gain to the species in light of other past, present, and reasonably foreseeable future actions considered in this CEA.

There are two SFA comprising 2,593,700 acres in MZ V as a whole. The Sheldon-Hart Mountain NWR Complex Area (1,910,500 acres) in southeast Oregon and northwest Nevada is entirely within MZ V. The Southeast Oregon/North-Central Nevada SFA is mostly within MZ IV, though a 683,200-acre portion is within MZ V.

Oregon Statewide Efforts

The Oregon Department of Fish and Wildlife (ODFW). ODFW has developed a strategy to promote conservation of GRSG and intact, functioning GRSG habitats in Oregon. The *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat* (Oregon State Plan, Hagen 2011) describes the ODFW’s proposed management of GRSG. It also provides guidance to public land management agencies and land managers for GRSG conservation. GRSG conservation guidelines in the State Plan are designed to maintain (at a minimum) or enhance the quality (the optimum) of

current habitats. They will also assist resource managers in achieving the population and habitat objectives of the State Plan.

The Oregon State Plan provides biological recommendations for long-term conservation of GRSG in Oregon based on the best available science; however implementing recommendations is the responsibility of the respective land manager. Thus, the intent of the Oregon State Plan is plan is to inform decision-maker regarding the biological consequences of various actions on GRSG, but not to dictate land management decisions. Similarly, GRSG conservation proposed in the plan is voluntary on private lands (Hagen 2011, p. viii).

The Oregon State Plan establishes “Core Areas” to help delineate landscape planning units by distinguishing areas of high biological value to GRSG. These areas are based on the locations of breeding areas, wintering areas, and connectivity corridors and are intended to help balance GRSG habitat requirements with development outside of Core Areas, which would be subject to stipulations and regulations (Hagen 2011, p. 80). ODFW developed Core Areas necessary to conserve 90 percent of Oregon’s GRSG population with emphasis on highest density and important use areas which provide for breeding, wintering and connectivity corridors. BLM used the same boundaries of ODFW Core Areas to delineate PHMA.

While the plan is comprised of voluntary management guidelines, the guidelines may be utilized by state regulatory agencies including the Energy Facility Siting Council as conditions of approval on a case-by-case basis for certain energy projects. For example, the council has jurisdiction on wind energy projects greater than 105 MW (Dave Budeau, phone conversation with author, March 26, 2015).

Further, The Oregon Governor’s natural resources department is currently in the process of developing regulations for GRSG conservation. The forthcoming Sage Grouse Conservation Action Plan will supplement the state plan and provide land use regulations and mitigations for Oregon core habitat areas (Dave Budeau, phone conversation with author, March 26, 2015).

Oregon Candidate Conservation Agreements (CCA) and Candidate Conservation Agreements with Assurances (CCAA). CCAs are voluntary agreements between the USFWS and one or more parties (including federal agencies) to address the conservation needs of on-listed species at risk of being listed under the ESA. CCAAs are similar, though these voluntary agreements are made between the USFWS and non-federal landowners. One CCA and several CCAAs are currently in place or will soon be implemented that will cover the entire GRSG range in the state of Oregon. Under these agreements and the associated Enhancement of Survival permit issued under the ESA, landowners would voluntarily undertake management activities on their properties to enhance, restore, or maintain habitat benefiting GRSG, in exchange for assurances that they would not be subject to increased land use

restrictions should GRSG become listed under the ESA in the future. The agreements have a term of 30 years, and can be renewed upon expiration. Management activities would be guided by a Site Specific Plan (SSP), a unique management plan developed to address threats to GRSG on a particular allotment or property and that are approved by USFWS. As of April 2015, over 2.7 million acres of GRSG habitat in Oregon are either enrolled or pending enrollment under such agreements; the amount of GRSG habitat enrolled is expected to rise as the GRSG listing decision nears (Jeff Everett, Email to author, April 16, 2015).

GRSG Programmatic Candidate Conservation Agreement for Rangeland Management Practices on BLM Lands in Oregon. In cooperation with the BLM and USFWS, the Oregon Cattlemen's Association developed a Programmatic Candidate Conservation Agreement (Programmatic CCA) to reduce or eliminate negative impacts of rangeland management practices to GRSG and to maintain and support livestock grazing practices that are beneficial or neutral to GRSG on enrolled allotments administered by the BLM in Oregon. The Programmatic CCA covers approximately 10.2 million acres of GRSG habitat on BLM grazing allotments in southeast Oregon; however, not all these lands may eventually be enrolled in the programmatic CCA (USFWS 2013b). As of April 2015, BLM has received 65 written requests for development of an SSP and enrollment in the CCA. The written requests represent 121 allotments covering more than 1.9 million acres (Jeff Everett, Email to author, April 16, 2015).

Harney County Programmatic CCAA. After implementation of the Programmatic CCA described above, Oregon's Harney County Soil and Water Conservation District developed a programmatic CCAA for private lands in the county (USFWS 2013c). The covered area encompasses all GRSG habitat on non-federal lands in Harney County, Oregon and on some lands immediately adjacent to but outside of Harney County, including 346,965 acres of PPH and 825,395 acres of PGH. BLM-administered grazing allotments within Harney County are still eligible for inclusion under the Programmatic CCA. Because many grazers in Oregon utilize both private lands and BLM-administered allotments, the CCAA was structured after the Programmatic CCA in part to facilitate implementation of the agreements and encourage enrollment by such grazers (Jeff Everett, phone conversation with author, April 16, 2015). As of April 2015, 54 landowners have submitted letters of intent to enroll in the CCAA and have SSPs developed for their lands, which total approximately 320,000 acres of GRSG habitat (Jeff Everett, Email to author, April 16, 2015).

Oregon Multi-County Soil and Water Conservation District Programmatic CCAA. Following development of the Harney County Programmatic CCAA, USFWS and the Soil and Water Conservation Districts from Baker, Crook, Deschutes, Grant, Lake, Malheur, and southern Union counties developed a programmatic CCAA for over 2.3 million acres of private rangelands within these counties, which represents the range of GRSG in Oregon. Again, BLM-

administered grazing allotments within the counties are still eligible for inclusion under the Programmatic CCA, and again, the CCAA was structured after the Harney County CCAA in part to facilitate implementation of the agreements and encourage enrollment by grazers who utilize both private and BLM-administered allotments. As of April 2015, 55 landowners have submitted letters of intent to enroll in the CCAA and have SSPs developed for their lands, which total approximately 466,050 acres of GRSG habitat (Jeff Everett, Email to author, April 16, 2015).

The Oregon Department of State Lands (DSL) CCAA. DSL is working with the FWS to develop a CCAA for State Common School Fund Rangelands in Oregon. These lands represent the final “gaps” in land ownership throughout GRSG range in Oregon not already covered by the CCA/CCAAs described above. The CCAA covers over 633,000 acres of DSL lands, including approximately 380,700 acres of low-density habitat, and 153,100 acres of core area habitat (80 FR 9475). The required Environmental Assessment under NEPA is currently available for public comment and will be finalized in May 2015 (Jeff Everett, phone conversation with author, April 16, 2015).

Pacific Northwest Regional Infrastructure Team. In May 2013, Oregon Governor John Kitzhaber signed a Declaration of Cooperation with Secretary of the Interior Sally Jewell on the Pacific Northwest Regional Infrastructure Team. The Governor’s offices of Washington and Idaho are also partners. This agreement recognized the need to, among other objectives, ensure environmental and natural resource stewardship including mitigating and protecting GRSG, while advancing infrastructure projects, further energy independence, and manage climate change risk.

Nevada/California State Efforts

Nevada State Plan. The state of Nevada submitted a state alternative for inclusion in the Nevada and Northeast California Sub-Regional Greater Sage-Grouse Draft LUPA/EIS. The *Nevada Greater Sage-Grouse Conservation Plan* (SETT 2014) includes regulatory mechanisms to avoid, minimize (with the use of design features) and/or mitigate impacts through the Conservation Credit System (described in additional detail below) to protect and restore GRSG habitat. The plan defines the Sage Grouse Management Area (SGMA), and aims to reach a goal of a net conservation gain of GRSG habitat due to new anthropogenic disturbances. The state plan identifies GRSG core, priority, and general habitat within the SGMA.

Under the plan, project proponents must seek to avoid GRSG habitat disturbance. If a project proponent wishes to demonstrate that avoidance cannot be reasonably accomplished, minimization and mitigation would be applied through SETT Consultation. The project proponent must demonstrate that specific criteria are met; criteria are summarized in Table 3-1 of the plan. Criteria are more stringent in core habitat, and less so in general habitat. If a

project cannot avoid adverse effects (direct or indirect) to GRS habitat, the project proponent would be required to implement design features that minimize the project's adverse effects to GRS habitat to the extent practicable. Mitigation would be required for all anthropogenic disturbances to GRS habitat, including those that have minimized disturbances through the process above. Mitigation requirements would be determined by the Conservation Credit System, a market-based mechanism that quantifies conservation outcomes (credits) and impacts from new anthropogenic disturbances (debits), defines standards for market transactions, and tracks conservation action implementation progress in the state.

GRS habitat is determined based on the Nevada Habitat Suitability Map (described below) for GRS habitat prepared by the state and USGS. The habitat map incorporates GRS telemetry data along with environmental data at multiple scales, such as land cover, vegetation communities, physiographic indices and anthropogenic attributes. The habitat suitability model will be used to inform management decisions on protecting GRS habitat and to provide strategic decision tools to identify where conservation activities will have the greatest beneficial impact on GRS and its habitat. The Nevada state plan only applies to lands within the state of Nevada; it does not apply to portions of the Nevada and Northeastern California Sub-region within California.

The Greater Sage-Grouse Conservation Plan for Nevada and Eastern California. The plan (Sage-Grouse Conservation Team 2004) is a collaboration between the Nevada Governor's Sage-Grouse Conservation Team, Nevada Department of Wildlife, and the California Department of Fish and Game (now California Department of Fish and Wildlife). The plan provides an assessment of GRS populations in Nevada and Eastern California, the risk factors facing GRS populations, strategies and actions to reduce or eliminate those risk factors, and implementation and monitoring strategies. The risk factors identified as affecting Nevada and California GRS populations the most include habitat quantity, quality, and wildfire. The plan provides recommended management actions to improve or mitigate these risk factors, including conifer removal, wildfire prevention vegetation treatments, sagebrush and perennial grass restoration techniques, evaluating and altering livestock grazing, and cheatgrass management.

Nevada State Regulations/Programs. Nevada has several state regulations and programs pertaining to GRS. Assembly Bill 461 formally created and gave regulatory authorization for the Sagebrush Ecosystem Program. Governor Sandoval signed the bill into law in July, 2013. Nevada also has a pesticide registration fee; portions of the revenue from the fee will provide funding to the state noxious weed program and GRS habitat conservation (Nevada Department of Agriculture [NDA] 2013). The state also has a Nevada Cheatgrass Action Team, a voluntary multi-disciplinary group of individuals to assist the SETT with planning and managing projects to address cheatgrass and other invasive plants that impact GRS habitat.

Nevada and Northeastern California Habitat Mapping. GRSG habitat for the sub-region was derived from a quantitative approach using “*A Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California: A Decision Support Tool for Management*” (Coates et al. 2014). GRSG telemetry location data was compiled from multiple areas across Nevada and northeastern California. Telemetry data was then linked spatially with corresponding environmental covariates to enable calculations of population-level resource selection functions (Manly et al. 2002). Locations of active leks were also used as an additional dataset for map validation. The map reflects both the presence of GRSG and the presence of habitat features associated with GRSG occupancy, and can be used to prioritize areas for different management scenarios. The strength of the map is to account for characteristics that describe the quality of the environment for GRSG, as well as an index of population abundance (Coates et al. 2014) (See Chapter 3, Section 3.2.3-Management Zones). The three management categories derived from this mapping process for the Nevada and Northeastern California Sub-region includes: “Priority”, “General” and “Other” Habitat Management Areas.

Additional regional efforts specific to the Bi-State distinct population segment of GRSG exist, however, these efforts are not discussed here as the Bi-State DPS is not included in this CEA.

Natural Resource Conservation Service Sage Grouse Initiative

The Natural Resource Conservation Service’s (NRCS) Sage-Grouse Initiative (SGI) is working with private landowners in 11 western states to improve habitat for GRSG (Manier et al. 2013). With approximately 31 percent of all sagebrush habitats across the range in private ownership (Stiver 2011, p. 39), including nearly 2 million acres (16 percent) in MZ V (Manier et al. 2013, p. 118), a unique opportunity exists for the NRCS to benefit GRSG and to ensure the persistence of large and intact rangelands by implementing long-term contracts and conservation easements. Although most SGI funds are invested on private lands, funds are also used to implement conservation measures on BLM-administered and other public lands.

Participation in the SGI program is voluntary, but willing participants enter into binding contracts to ensure that conservation practices that enhance GRSG habitat, such as fence marking, protecting riparian areas, and maintaining vegetation in nesting areas, are implemented. Participating landowners are bound by a contract (usually 3 to 5 years) to implement, in consultation with NRCS staff, conservation practices if they wish to receive the financial incentives offered by the SGI. These financial incentives generally take the form of payments to offset costs of implementing conservation practices and easements or rental payments for long-term conservation.

While potentially effective at conserving GRSG populations and habitat on private lands, incentive-based conservation programs that fund the SGI generally

require reauthorization from Congress under subsequent farm bills, meaning future funding is not guaranteed.

As of 2015, SGI has secured conservation easements on over 455,000 acres across the GRSG range (NRCS 2015), with the largest percentage of easements occurring in Wyoming (approximately 200,000 acres). In MZ V, SGI has thus far secured conservation easements on 28,871 acres that maintain intact sagebrush-grassland habitat. It has also accomplished the following within MZ V:

- Established over 88,000 acres where grazing management promotes GRSG habitat and sustainable ranching
- Removed conifers encroaching on 175,595 acres of GRSG habitat
- Seeded over 1,000 acres with native plants
- Marked 80 miles of fences in GRSG habitat

Other Regional Efforts

Tribes, counties, and local working groups are also playing a critical role in promoting GRSG conservation at the local level. Individual conservation plans have been prepared by some local working groups in MZ V to develop and implement strategies to improve or maintain GRSG habitat and reduce or mitigate threats on the local level. The proposed conservation actions and recommendations in these plans are voluntary actions for private landowners. Local working group projects have included monitoring, research, and mapping habitat areas, as well as public outreach efforts such as landowner education and collaboration with federal, state, and other local entities. These efforts provide a net conservation gain to GRSG through increased monitoring and public awareness. Local working groups in MZ V include: the Prineville, Lakeview, Burns, and Vale local working groups in Oregon (Portions of Burns and Vale are also within MZ IV, and an additional group in Oregon, Baker, is entirely within MZ IV), and the Washoe/Modoc and North Central Nevada local working groups in Nevada (the Washoe/Modoc group is also partially in California, and both groups are also within MZ III).

Elko County, in northeast Nevada, has developed a GRSG Management and Conservation Strategy Plan (County of Elko 2012). The plan is based primarily on wildfire fuels and predator reduction.

5.3.5 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Oregon RMPA and alternatives in combination with other past, present, and reasonably foreseeable future federal and non-federal actions on lands in MZ V (see **Table 5-21**). Where these actions occur within GRSG habitat, they would cumulatively add to the impacts of BLM-authorized activities set forth in the Oregon RMPA. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, private,

or mixed land ownership in MZ V are described in the Nevada and Northeastern California LUPA, which is incorporated by reference.

The following list includes past, present, and reasonably foreseeable future actions in MZ V that, when added to the Proposed Plan and alternatives for the Oregon Sub-region could cumulatively affect threats to GRSG:

- Wagontire Wind Energy Development Project, Harney County, Oregon
- Buckskin Mountain Wind Energy Development Project, Harney County, Oregon
- Several ongoing locatable minerals mining operations in Lake and Harney Counties, Oregon
- North Steens 230-kV Transmission Line Project, Harney County, Oregon
- West Butte Wind Power ROW Project, Crook and Deschutes Counties, Oregon
- Vya PMU Programmatic Habitat Restoration and Fuels Reduction Project, northeast California and northwest Nevada
- Northeastern California Juniper Treatment Project, northeast California and northwest Nevada
- North Steens Ecosystem Restoration Project, Harney County, Oregon
- South Warner Sagebrush Sage-Grouse Habitat Restoration, Lake County, Oregon
- Five Creeks Rangeland Restoration Project, Harney County, Oregon
- Steens Mountain Comprehensive Recreation Plan, Harney County, Oregon
- Greater Sage-Grouse Programmatic Candidate Conservation Agreement for Rangeland Management Practices on BLM Lands, OR
- Integrated Invasive Plant Management Environmental Assessments for Burns, Lakeview, Prineville, and Vale Districts
- Wildhorse Gathers EAs

5.3.6 Threats to GRSG in Management Zone V

In its COT report the USFWS identifies wildfire, spread of invasive plants, conifer encroachment, infrastructure development, livestock grazing and free-roaming equids, conversion to agriculture, energy development, and recreation as the present and widespread threats facing GRSG in MZ V (USFWS 2013a). These threats impact GRSG mainly by fragmenting and degrading their habitat.

The loss of sagebrush steppe across the West approaches or exceeds 50 percent in some areas. It is a primary factor in long-term declines in GRSG abundance across its historical range (USFWS 2010).

Habitat fragmentation reduces connectivity of populations, increases predation pressure, and increases the likelihood of extirpation from random events such as drought or outbreak of West Nile virus. Furthermore, climate change is likely to affect habitat availability to some degree by decreasing summer flows and limiting growth of grasses and forbs, thereby limiting water and food supply. Climate change is also increasing certain threats as increasing atmospheric CO₂ concentrations and warming temperatures favor cheatgrass and encroaching conifers (Knapp et al. 2001, Ziska et al. 2005, Blank et al. 2006) and warming temperatures and changing precipitation seasonality increases stress on sagebrush and increases the frequency of extreme burning conditions. Sensitive species such as GRSG, which are already stressed by declining habitat, increased development, and other factors, could experience additional pressures as a result of climate change.

Each COT report threat considered present and widespread in at least one population in MZ V is discussed below. For more detail on the nature and type of effects and the direct and indirect impacts on GRSG in the sub-region, see **Section 4.2** of the Oregon RMPA/EIS. The quantitative impact analysis focuses on impacts in MZ V, with sub-region acres provided for context.

For those threats below that are analyzed quantitatively (infrastructure, livestock grazing, conversion to agriculture, energy development and mining, and recreation), acres presented in the analyses tables represent acres of land allocations from each of the Oregon Sub-region RMPA/EIS alternatives in the Oregon sub-region portion of MZ V, combined with acres of land allocations from the Proposed Plans of additional BLM and Forest Service sub-regions in the non-Oregon sub-region portion of MZ V. The only additional sub-region in MZ V is the Nevada and Northeastern California sub-region, so the acres presented in the analyses tables are the Nevada and Northeastern California Proposed Plan allocations combined with allocations from each of the Oregon alternatives. The percentages in the tables represent the relative contribution of each Oregon sub-region alternative to the total allocation in the MZ.

Wildfire

Nature and Type of Effects. Big and low sagebrush burned by wildfire often require many years to recover, especially after large wildfires, although mountain big sagebrush can recover from soil stored seed. Contiguous old-growth sagebrush sites are at high risk from wildfire, as are large blocks of contiguous dead sagebrush and sagebrush sites with a substantial cheatgrass understory. Before recovering, these sites are of limited use to GRSG, except along the edges and in unburned islands.

Because of its widespread impact on habitat, wildfire has been identified as a primary factor associated with GRSG habitat loss and subsequent population declines. Depending on the species of sagebrush and the size of a burn, a return to a full pre-burn community cover can take from 25 to 120 years (Baker 2011, Miller et al. 2011). While wildfire may have variable effects on long- and short-term post-fire invertebrate food source availability for GRSG (Nelle et al. 2000, Fischer et al. 1996, Rickard 1970), any increase in invertebrate abundance may be of little value to GRSG as the reduction in vegetation cover post-wildfire would likely lead to increased predation vulnerability (Nelle et al. 2000).

While most sagebrush subspecies are killed by fire and are relatively slow to reestablish, cheatgrass recovers and reestablishes quickly after a wildfire from residual seed in the soil and increased seed production in the first two to three years after burning. Further, the longer that cheatgrass has been dominant on a site, the more it alters soil characteristics to favor reestablishment of itself after a wildfire and disfavor native species. This rapid recovery and site alteration can lead to a reoccurring wildfire cycle that often prevents sagebrush reestablishment (USFWS 2010, p. 22).

BLMs management to prevent or control wildfires can also affect GRSG and habitat. Increased human activity and noise associated with wildfire suppression, fuels treatments, and prescribed fire in areas occupied by GRSG could affect breeding and foraging behavior. Important habitats could be altered over the long-term from use of heavy equipment, or temporarily from noise arising from small engines, such as chainsaws and pumps, and from low-level flights by fixed- and rotary-wing aircraft.

In addition, wildfire suppression can result in higher rates of conifer encroachment in some areas. In the initial stages of encroachment, fuel loadings remain consistent with the sagebrush understory. As conifer encroachment advances, fire return intervals are altered by decreasing understory abundance. The depleted understory causes the stands to become resistant to low-intensity wildfires; over years, the accumulating conifer loads contribute to larger-scale wildfires and confound control efforts due to extreme wildfire behavior. Cheatgrass or other annual grasses tend to dominate in the drip-ring around conifer crowns.

Climate change will likely have an effect on the frequency and severity of rangeland wildfire in the Great Basin (including southern and eastern Oregon) through predicted decreased summer precipitation, spread of annual invasive plants like cheatgrass, and associated increase in fuels (OCCRI 2010; Homer et al. 2015). Frequent wildfire removes vulnerable sagebrush shrubs and encourages invasive annual grass spread, which can further increase wildfire frequency (Neilson et al. 2005). In big sagebrush in the Great Basin, invasion by annual grasses has resulted in dramatic increases number of wildfires, wildfire return frequency, and widespread detrimental effects on GRSG habitat (Young

and Evans 1978, West and Young 2000, West and Yorks 2002, Connelly et al. 2004, Neilson et al. 2005).

Conditions in the sub-region and MZ V. Wildfire has been a primary threat to GRSG habitats and populations occurring across MZ V, with 67 percent of priority habitat and general habitat having high risk for wildfire, including the Western Great Basin and Central Oregon population areas (Manier et al. 2013, p. 133). Since 2000, approximately 1.6 million acres (17 percent of priority habitat and 6 percent of general habitat) of GRSG habitats have burned in this MZ, with an average of more than 95,000 acres of priority habitats burned annually; with a maximum yearly burn of nearly 1 million acres (Manier et al. 2013, p. 83). Wildfires on BLM lands contribute 88 percent of average acres burned in this MZ annually (Manier et al. 2013, p. 82-83). In 2012, the Rush Fire burned more than 265,000 acres of PACs in California and more than 313,000 acres in Nevada, comprising portions of the Western Great Basin population; this wildfire also affected most of the largest leks in the region and may have isolated subpopulations through removal of connectivity habitat (USFWS 2013a, p. 83). Also in 2012, the Lone Willow portion of the Western Great Basin population was affected by the Holloway Fire, which burned approximately 221,000 acres in Oregon and 140,000 acres in Nevada, of habitat considered important or essential for GRSG (USFWS 2013a, p. 84). In 2012, the Miller Homestead and Long Draw fires in southeastern Oregon burned 160,800 and 558,200 acres, respectively, mostly on BLM-administered lands with significant losses of GRSG habitat (BLM 2013c).

Impact Analysis. Management actions in the Oregon Sub-region that emphasize wildfire suppression in GRSG habitat would benefit the species by limiting habitat loss in the event of wildfire. The COT report objective for wildfire is to retain and restore healthy native sagebrush plant communities within the range of GRSG.

Under current management (Alternative A), prescribed fire may be used to achieve vegetation objectives. Alternatives B through F, and the Proposed Plan, would all provide for similar protection of sagebrush habitats in carrying out wildfire suppression activities, and they include prescribed fire as a treatment option for vegetation management. The action alternatives all prioritize wildfire suppression in GRSG habitat, and incorporate wildland fire management RDFs (with the exception of Alternative E) which would provide a beneficial impact to GRSG by protecting habitat. Therefore, the action alternatives would provide increased emphasis on GRSG habitat during prescribed burning, fuels treatments and wildfire suppression activities over the No Action alternative.

The Proposed Plan and Alternative D would provide additional protections for sagebrush habitat and GRSG through regulatory commitments to reduce the threats of habitat loss, degradation and fragmentation from wildfire. The inter-agency Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer

Expansion Assessment (Fire and Invasive Assessment Tool; FIAT 2014) under the Proposed Plan would prioritize landscapes for wildfire prevention and suppression, fuels management, and habitat restoration and rehabilitation within key GRSG habitats based on resistance and resilience concepts in Chambers et al. (2014). Use of prescribed fire in GRSG habitat would be avoided unless site-specific conditions show a net benefit to GRSG from a prescribed fire. The Proposed Plan would provide more explicit guidance for wildfire suppression, and additional management flexibility and guidance would be incorporated to tailor management for specific vegetation communities. This is in accordance with the COT report objective to retain and restore healthy native sagebrush plant communities within the range of GRSG.

The Interagency Standards for Fire and Fire Aviation Operations “Red Book” includes BMPs for GRSG habitat conservation for wildlife and fuels management (BLM 2013a). This document is a supplemental policy or guidance for the BLM, the Forest Service, and the USFWS. These BMPs could benefit the GRSG during interagency wildland fire operations by using spatial habitat data and predictive services to prioritize and preposition firefighting resources in GRSG habitat. However, since several years have elapsed since GRSG BMPs were incorporated, benefits would likely now be apparent, and it is unclear if this is currently the case. In January 2015, Secretarial Order 3336 “Rangeland Fire Prevention, Management and Restoration” was signed by the Secretary of the Interior. The order sets forth enhanced policies and strategies for preventing and suppressing rangeland wildfire and for restoring sagebrush landscapes impacted by wildfire across the West. The order will improve coordination with local, state, tribal, and regional efforts to address rangeland wildfire at a landscape level.

Coordination with rural fire districts to manage wildfires in GRSG habitat will further reduce this threat across land ownership types and improve the quality and quantity of habitat.

Reasonably foreseeable wildland fire management efforts are projected to increase (**Section 5.3.12**), especially through increased coordination of federal, state, and local wildfire prevention actions and the implementation of the Nevada and Northeastern California Sub-region BLM and Forest Service LUPA in MZ V. When the impacts of the Oregon Sub-region RMPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

However, in those years where wildfires that threaten wildland-urban interface are widespread, firefighting resources would be shifted to those areas and away from GRSG habitat. Years with extensive involvement of wildland-urban interface in wildfires may not see the expected benefits of direction intended to increase wildfire response in GRSG habitat.

Spread of Invasive Plants

Nature and Type of Effects. As discussed in **Chapter 4**, invasive plants alter plant community structure and composition, productivity, nutrient cycling, and hydrology. Invasive plants also may cause declines in native plant populations, including sagebrush habitat, through such factors as competitive exclusion and niche displacement. Invasive plants reduce and may eliminate vegetation that GRSG use for food and cover. Invasive plants fragment existing GRSG habitat, which favors nest predators such as ravens (Howe et al. 2014), and reduce habitat quality by competitively excluding vegetation essential to GRSG. Invasive plants can also create long-term changes in ecosystem processes, such as wildfire cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004). In big sagebrush in the Great Basin, invasion by invasive annual grasses has resulted in dramatic increases number of wildfires, wildfire return frequency, and widespread detrimental effects on GRSG habitat (Young and Evans 1978, West and Young 2000, West and Yorks 2002, Connelly et al. 2004). Big sagebrush communities invaded by cheatgrass have estimated mean fire-return intervals of less than 10 years in many areas (Connelly et al., 2004), whereas a return to a full pre-burn community cover can take from 25 to 120 years depending on the species of sagebrush and the size of a burn (Baker 2011, Miller et al. 2011).

Roads and recreational activities can promote the spread of invasive plants through vehicular traffic. Invasive plants can further exacerbate the fragmentation effects of roadways. Improperly managed grazing in these habitats can lead to the demise of the most common perennial grasses in this system and an abundance of invasive annual grasses such as cheatgrass or medusahead (Reisner et al. 2013).

Conditions in the Sub-region and MZ V. Via seeds carried by wind, humans, machinery, and animals, invasive plants have invaded and will continue to invade many locations in MZ V, including the sub-region. Some species, including cheatgrass, have become so ubiquitous throughout the sub-region that it is considered economically unfeasible to attempt to eradicate them such as those areas that have crossed a threshold that precludes their returning to traditional plant community composition through normal plant succession. Modeling has suggested that more than 5.6 million acres of GRSG habitat MZ V are considered to be at a moderate to high risk for cheatgrass occurrence (Manier et al., 2013, p. 90)

The BLM currently manages invasive plant infestations through integrated invasive plant management, including biological, chemical, mechanical, manual, and educational methods. It is guided by the 1991 and 2007 Records of Decisions (RODs) for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991) and by the 2007 Programmatic Environmental Report (BLM 2007). The July 2010 Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS and ROD (BLM 2010) provides additional guidance

within the Oregon sub-region. The BLM also participates in the National Early Warning and Rapid Response System for Invasive Species. The goal of this system is to minimize the establishment and spread of new invasive plants through a coordinated framework of public and private processes (FICMNEW 2003). Invasive plants are managed in cooperation with county governments and represent a landscape-level approach across management jurisdictions.

Impact Analysis. Increased ground-disturbing actions, including cross-country motorized travel, ROW construction, and animal travel, would increase the chance for the establishment and spread of invasive plants. The COT report objective for invasive plants is to maintain and restore healthy native sagebrush plant communities.

Management under Alternative A would allow for the most acres of surface disturbance; therefore, the potential for invasive plant spread and establishment would be greatest under this alternative, and effects to GRSG (e.g., reduction in quality of habitat) would be more pronounced if all of the potential surface disturbance would occur. All of the action alternatives would reduce potential surface disturbance relative to the No Action alternative, and all alternatives, including the No Action alternative, contain invasive plant prevention measures to differing extents. Alternative C relies on passive management for restoration efforts, which has shown no ability to reduce or halt the spread of invasive plants or to promote recovery of native plant communities where invasive plants are dominant. Alternatives that include the 3 percent (no more than 1 percent per decade) anthropogenic disturbance threshold which would limit new surface disturbance; extensive mitigation and monitoring plans; wildfire and invasive plants assessments and subsequent lands prioritization; application of RDFs and BMPs; and requirement for net conservation gain of GRSG habitat would have a lower potential for invasive plant spread as a result of development. These alternatives include B, D, F and the Proposed Plan. This is in accordance with the COT report objective to maintain retain and restore healthy native sagebrush plant communities.

Invasive plants on BLM-administered and National Forest System lands would be treated under all alternatives, though management in the Proposed Plan would provide the widest range of potential management actions for treatment. This would provide the highest potential for a net conservation gain to GRSG by restoring degraded sagebrush habitat.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive plants on both federal and non-federal lands. Conversely, cumulative actions incorporating significant habitat restoration would decrease the potential for spread of invasive plants in the management zone. A number of projects are ongoing or in the planning phase to restore native habitat and treat nonnative, invasive plants (see **Table 5-21**).

Reasonably foreseeable invasive plant management efforts are projected to increase (**Section 5.3.12**), including other state and county noxious weed regulations and the implementation of the Nevada and Northeastern California Sub-region BLM and Forest Service LUPA in MZ V. When the impacts of the Oregon RMPA are added to these actions, this would result in a net conservation gain to GRS habitat and populations in MZ V. The Proposed Plan and Alternatives B, D, and F may result in the greatest net conservation gain due to its 3 percent anthropogenic disturbance cap that should reduce potential for the spread of invasive plants during the 20-year analysis period.

Conifer Encroachment

Nature and Type of Effects. Conifer woodlands, especially juniper (*Juniperus* spp.) and in some regions pinyon pine (*Pinus edulis*), may expand into sagebrush habitat and reduce availability of habitat for GRS. Conifer expansion may be encouraged by human activities, including wildfire suppression and grazing (Miller et al. 2011). Trees offer perch sites for raptors; thus, woodland expansion as with power lines may also increase the threat of predation, (Manier et al. 2013, p. 91; Howe et al. 2014). Locations within approximately 1,000 yards of current pinyon or juniper woodlands are at highest risk of expansion (Bradley 2010). Studies have shown that GRS incur population-level impacts at very low levels of conifer encroachment (Baruch-Mordo et al. 2013). In the Great Basin (best documented in MZs III, IV, and V), conifer encroachment is connected to reduced habitat quality in important seasonal ranges when woodland development is sufficient to restrict shrub and herbaceous production (Connelly et al. 2004 in Manier et al. 2013, p. 91).

Conditions in the Sub-region and in MZ V. Conifer encroachment risk is high on approximately 1.4 million acres of GRS habitat in MZ V (Manier et al. 2013, p. 93). Approximately 73 percent of conifer encroachment risk in priority habitat (and 65 percent in general habitat) occur on BLM-administered lands within MZ V (Manier et al. 2013, p. 94). In comparison, 13 percent of conifer encroachment risk in priority habitat (and 25 percent in general habitat) occur on private lands and 1 percent in priority habitat occurs on National Forest System lands (5 percent in general habitat). Therefore, BLM actions are likely to have the greatest potential to ameliorate the effects of conifer encroachment on GRS habitat, in both PHMA and GHMA, than any other single land management entity.

Impact Analysis. The COT objective for conifer encroachment is to remove conifer woodlands from areas of sagebrush that are most likely to support GRS (post-removal) at a rate that is at least equal to the rate of encroachment (USFWS 2013a, p. 47).

Management under Alternatives D, E, and the Proposed Plan would target conifers in GRS habitat for removal, with the clearest treatment priorities under Alternative D and the Proposed Plan, which identify Restoration

Opportunity Areas as key location for restoration projects and provide subsequent criteria for conifer removal. Additionally, the Proposed Plan would incorporate GRSG habitat objectives to guide treatments. Alternatives A, B, C, and F are largely silent on conifer removal and thus would not serve to reduce this threat, or be in alignment with the COT objective for conifer encroachment.

Relevant cumulative actions on federal, private, and state lands within the MZ include several large conifer removal projects (See **Table 5-21**). Additional actions in MZ V include conifer removal projects guided by existing California BLM field office RMPs in the southern portion of MZ V, which incorporate the Sage Steppe Ecosystem Restoration Strategy (BLM 2008). This strategy includes conifer removal projects in specific project areas. Further, the NRCS includes conservation measures to remove encroaching conifers near leks and GRSG seasonal habitats while minimizing disturbance to GRSG (NRCS 2012, p. 13). SGI has helped reduce the threat of early succession conifer encroachment through mechanical removal on 175,595 acres of private lands within MZ V. The majority of these efforts were located inside PACs (NRCS 2015), helping to restore historic fire return intervals and important GRSG habitat development.

Reasonably foreseeable conifer encroachment management efforts are projected to increase (**Section 5.3.12**), including efforts on private land and implementation of the Nevada and Northeastern California Sub-region BLM and Forest Service LUPA in MZ V. When the impacts of the Oregon RMPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V. The Proposed Plan would have the greatest reduction in the threat from conifer encroachment and provide a net conservation gain to GRSG. Alternatives D and E would also reduce the threat, though to a lesser degree than the Proposed Plan because they do not specify acres for treatment or habitat objectives.

Infrastructure

Rights-of-Way

Nature and Type of Effects. As discussed in **Chapter 4**, transmission lines can directly affect GRSG by posing a collision and electrocution hazard. They also can indirectly decrease lek attendance and recruitment by providing perches and nesting habitat for potential avian predators such as golden eagles and ravens (Connelly et al. 2004; Coates et al. 2014). In addition, power lines and pipelines often extend for many miles and fragment habitat. The ground disturbance associated with construction, as well as vehicle and human presence on maintenance roads, may introduce or spread invasive plants over large areas, degrading habitat. Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats, facilitate predator

movements, spread invasive plants, and increase human disturbance from noise and traffic (Forman and Alexander 1998).

Development of infrastructure in GRSG habitat results in habitat loss, fragmentation, and may cause habitat avoidance by GRSG. Infrastructure development also introduces invasive plant species and predators to GRSG habitat, and provides perching and nesting sites for avian predators of GRSG.

Conditions in the Sub-region and in MZ V. Infrastructure, such as ROWs and associated facilities and urbanization, is widespread throughout MZ V. In some locations, infrastructure development has affected GRSG habitat. Development of roads, fences, and utility corridors has also contributed to habitat loss and fragmentation in portions of MZ V. The best available estimates suggest about 20 percent of MZ V is within approximately 4 miles of urban development (Knick et al. 2011, p. 214). Impacts of infrastructure development in MZ V are primarily related to highways, roads, power lines, and communication towers, with 95 percent of MZ V within 4 miles of a road, 15 percent within 4 miles of a power line, and 5 percent within 4 miles of a communication tower (Knick et al. 2011, pp. 215-216).

Although not representative of all infrastructure ROWs, transmission lines greater than 115 kilovolts indirectly influence 26 percent of priority habitat and 33 percent of general habitat across MZ V. Indirect effects are assumed to occur to a radius of 4 miles (Manier et al. 2013, p. 41). Approximately 77 percent of transmission lines in priority habitat and 64 percent in general habitat are on BLM-administered lands across GRSG habitats in MZ V (Manier et al. 2013, p. 41). In contrast, private and National Forest System lands contain 13 percent and 1 percent of transmission lines in priority habitat, respectively, and 27 percent and 2 percent in general habitat, respectively. Therefore, BLM actions are likely to have the greatest potential to affect transmission line ROWs in GRSG habitat than any other land management entity. Designating ROW exclusion and avoidance areas in PHMA and GHMA on BLM-administered lands could reduce the threat on these lands. However, in areas with scattered federal landownership, infrastructure may be routed around federal lands, often increasing its length and potential impact. ROW avoidance and exclusion areas on BLM-administered lands could increase this tendency.

The numbers of ROW authorizations are anticipated to grow in the sub-region. Increasing populations (see *Recreation and Urbanization*), continued energy development (see *Energy Development and Mining*), and new communication sites drive the need for new ROWs on both federal and non-federal lands.

Impact Analysis. **Table 5-2** lists the areas of ROW avoidance and exclusion in GRSG habitat by alternative.

Table 5-2
Acres of Rights-of-Way Designations in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-region	MZ V	Percent Within Sub-region
Open to Rights-of-Way				
Alternative A	1,247,000	97%	2,299,000	98%
Alternative B	36,000	0%	37,000	0%
Alternative C	36,000	0%	37,000	0%
Alternative D	36,000	0%	2,298,000	98%
Alternative E	36,000	0%	1,415,000	97%
Alternative F	36,000	0%	37,000	0%
Proposed Plan	91,000	62%	102,000	64%
Right-of-Way Exclusion				
Alternative A	957,000	25%	445,000	61%
Alternative B	2,963,000	76%	176,000	1%
Alternative C	2,963,000	76%	3,827,000	95%
Alternative D	957,000	25%	445,000	61%
Alternative E	2,963,000	76%	326,000	46%
Alternative F	2,963,000	76%	3,827,000	95%
Proposed Plan	965,000	26%	459,000	62%
Right-of-Way Avoidance				
Alternative A	2,427,000	33%	2,091,000	38%
Alternative B	1,633,000	<1%	4,623,000	79%
Alternative C	1,632,000	0%	971,000	0%
Alternative D	3,638,000	55%	2,091,000	54%
Alternative E	1,632,000	0%	1,980,000	51%
Alternative F	1,632,000	0%	971,000	0%
Proposed Plan	3,663,000	55%	4,324,000	78%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within rights-of-way designations in MZ V; it also displays the percentage of those acres that are found within the sub-region.

In general, the three ROW designations discussed below – exclusion, avoidance, and open – will provide differing levels of protection to GRSG and their habitat. Exclusion will usually provide the highest level of habitat protection, while avoidance provides less protection, and open the least amount of protection. See the *Glossary* for full definitions of exclusion, avoidance, and open. See

Chapter 2 for additional information regarding these designations in the Oregon Sub-region alternatives.

Alternative A (current management) leaves the greatest amount of GRSG habitat open to ROW development across MZ V. Alternative A does contribute to some ROW exclusion and avoidance areas, though not as many acres as other action alternatives do. Generally, Alternative A provides the least protective measures for GRSG habitat.

Compared to the No Action alternative, all action alternatives would reduce the amount of acres open to ROW development; Alternatives B through F would reduce open acres the most in PHMA, and Alternatives B, C, and F would do the same in GHMA. The Proposed Plan reduces open acres relative to the No Action alternative, but not to the extent of other action alternatives. However, the Proposed Plan contains measures, including the 3 percent disturbance cap (maximum 1 percent per decade), lek buffers, comprehensive RDFs and BMPs, and mitigation measures to avoid or reduce impacts of ROW developments in GRSG habitat to ensure a net conservation gain for GRSG habitat.

Alternatives C and F provide for the greatest number of ROW exclusion acres in GRSG habitat across MZ V, with Alternatives B and E contributing the same amount of exclusion in PHMA as Alternatives C and F, but less acres in GHMA. The No Action alternative, Alternative D, and the Proposed Plan contribute essentially the same amount of ROW exclusion in GRSG habitat across MZ V; however, measures in the proposed plan and Alternative D would serve to steer new disturbance away from PHMA and provide flexibility in siting ROWs to avoid impacts to GRSG habitat to compensate for the lesser amount of exclusion acres compared to the other action alternatives. For example, PHMA would be managed as wind and solar ROW exclusion areas, except in Harney, Lake, and Malheur counties outside of SFA, under the Proposed Plan, in addition to the other Proposed Plan measures discussed above.

Alternatives B and D provide for the greatest number of ROW avoidance acres in GRSG habitat across MZ V. Under both alternatives, PHMA would be managed as ROW avoidance area. Under the Proposed Plan, PHMA and GHMA are designated as avoidance areas for high voltage transmission lines and major pipelines ROWs.

Alternatives C and F would provide the greatest amount of ROW exclusion in GRSG habitat in MZ V, however exclusion areas may be ineffective, because existing infrastructure corridors have been sited in locations that minimize impacts, and relocation could merely push ROW development onto adjacent private land with fewer land use restrictions. Thus, the flexible approach under Alternative D and the Proposed Plan would be most effective in protecting GRSG habitat and would be most likely to meet the COT report objective, which is to avoid development of infrastructure in GRSG priority areas for conservation.

Projects in the Nevada portion of MZ V that require state agency review or approval would be subject to the Nevada state plan (SETT 2014) approval and consultation process. This would require project avoidance of GRSG core habitat, or minimization of impacts and mitigation for any remaining impacts to GRSG habitat through the state conservation credit system. Oregon has also developed a state plan (Hagen 2011) to achieve no net loss of GRSG core habitat from development; however, management guidelines in the plan, including avoidance, design features, and mitigation, are generally voluntary. Thus, the current Oregon plan may not be as protective of GRSG habitat as plans containing regulatory mechanisms for GRSG conservation on private lands, such as the Nevada state plan. However, the Oregon Sage-Grouse Action Plan currently under development will provide regulatory mechanisms for GRSG conservation on private and state lands. While the current Oregon plan is comprised of voluntary management guidelines, the guidelines may be utilized by state regulatory agencies including the Energy Facility Siting Council as conditions of approval on a case-by-case basis for certain energy projects. For example, the council has jurisdiction on wind energy projects greater than 105 MW (Dave Budeau, phone conversation with author, March 26, 2015).

The effect of the alternatives and other conservation actions in the MZ (most notably the Nevada state plan) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood rearing habitat, or other important areas that do not follow geopolitical boundaries.

Reasonably foreseeable ROW development in MZ V is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private GRSG conservation efforts as well as implementation of the Nevada and Northeastern California Sub-region BLM and Forest Service proposed plan in MZ V would reduce the threat by restricting the type and location of developments. When restrictions in the Oregon RMPA are added to these conservation actions, the impacts of future ROW developments would be further reduced. The Proposed Plan and Alternative D would provide the greatest net conservation gain by providing the flexibility to site ROWs with the least impact on GRSG habitat.

Renewable Energy: Wind and Solar

Nature and Type of Effects. Impacts on GRSG from renewable energy development, such as that for wind and solar power, are similar to those from nonrenewable energy development. Additional concerns associated with wind energy developments are rotor blade noise, structure avoidance, and mortality caused by collisions with rotating blades (Connelly et al. 2004). Development of wind and solar ROW infrastructure in GRSG habitat results in habitat loss and

fragmentation, and may cause habitat avoidance by GRSG. This type of development may introduce invasive plant species to GRSG habitat and provides perching and nesting sites for avian predators of GRSG.

Conditions in the Sub-region and in MZ V. Wind energy development is an increasing threat to some populations. Renewable energy development including wind have been identified as a threat to sage-grouse habitat in portions of Oregon's Western Great Basin population (Hagen 2011), with at least two proposed projects currently authorized (West Butte and Echanis) and others in planning stages (See **Table 5-21**). No commercial scale wind developments have been constructed in MZ V.

No current solar energy facilities measurably affect GRSG within the range (however, USFWS did identify small solar developments in California and Wyoming in the listing decision) (Manier et al. 2013, p. 66), and solar resources comparable to the areas where utility-scale solar production projects are being proposed or built are generally not present in MZ V. However, given technological developments, transmission infrastructure, and market forces within the lifespan of this analysis, solar potential across the southern range of GRSG including within MZ V may become attractive to solar development projects (Manier et al. 2013, p. 66). Several solar facilities under 5 MW are currently in operation in MZ V (Renewable Northwest Project 2015) and several additional solar facilities ranging in size between less than one MW and 12 MW are currently in the planning (Bend Bulletin 2015), permitting, or development stages (County of Lake 2015, Renewable Northwest Project 2015).

The numbers of ROW authorizations, including wind and solar ROWs, are anticipated to grow in the sub-region. Increasing populations (see *Recreation and Urbanization*), and continued renewable energy development including proposed wind projects in the sub-region drive the need for new ROWs on both federal and non-federal lands.

Geothermal energy development is discussed under *Energy Development and Mining*, below.

Impact Analysis. **Table 5-3** lists areas of wind energy ROW by alternative.

Alternative A (current management) leaves the greatest amount of GRSG habitat open to wind ROW development across MZ V. Alternative A does contribute to some wind ROW exclusion areas, though generally not as many acres as other action alternatives do. Alternative A provides the least protective measures for GRSG habitat.

Compared to the No Action alternative, all action alternatives reduce acres open to wind ROWs in GRSG habitat MZ V; Alternatives B, C, F, and the

Table 5-3
Acres of Wind Energy Management Designations in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-region	MZ V	Percent Within Sub-region
Open to Wind Rights-of-Way				
Alternative A	1,212,000	100%	2,262,000	100%
Alternative B	0	0%	0	0%
Alternative C	0	0%	0	0%
Alternative D	0	0%	2,261,000	100%
Alternative E	0	0%	1,378,000	100%
Alternative F	0	0%	0	0%
Proposed Plan	0	0%	0	0%
Wind Right-of-Way Exclusion				
Alternative A	2,624,000	9%	445,000	61%
Alternative B	4,630,000	49%	176,000	<1%
Alternative C	4,630,000	49%	3,827,000	95%
Alternative D	2,624,000	9%	445,000	61%
Alternative E	4,630,000	49%	326,000	46%
Alternative F	4,630,000	49%	3,827,000	95%
Proposed Plan	3,969,000	40%	424,000	59%
Wind Right-of-Way Avoidance				
Alternative A	795,000	100%	2,127,000	53%
Alternative B	1,000	100%	4,660,000	78%
Alternative C	0	0%	1,008,000	0%
Alternative D	2,006,000	100%	2,128,000	53%
Alternative E	0	0%	2,017,000	50%
Alternative F	0	0%	1,008,000	0%
Proposed Plan	750,000	100%	4,445,000	77%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within wind energy management designations in MZ V; it also displays the percentage of those acres that are found within the sub-region.

Proposed Plan reduce these acres the most. The Proposed Plan provides further protection by implementing additional measures including the 3 percent disturbance cap (maximum 1 percent per decade), lek buffers, comprehensive RDFs and BMPs, and mitigation measures to reduce impacts of ROW developments in GRSG habitat.

Alternatives C and F provide for the greatest number of wind ROW exclusion acres in GRSG habitat across MZ V, with Alternatives B and E contributing the same amount of exclusion in PHMA, but less acres in GHMA. Therefore, Alternatives C and F would be most protective to GRSG habitat. The proposed plan is not as protective of GRSG habitat as other action alternatives in terms of ROW exclusion; however, measures in the proposed plan may serve to compensate for the lesser amount of exclusion acres compared to the other action alternatives. For example, SFA within PHMA would be managed as wind and solar ROW exclusion areas under the Proposed Plan, in addition to the other Proposed Plan measures discussed above.

Alternative D and the Proposed Plan would contribute the greatest number of acres of wind ROW avoidance in GRSG habitat across MZ V. Under both alternatives, PHMA would be managed as ROW avoidance area.

Because they would provide the greatest amount of ROW exclusion within GRSG habitat, Alternatives C and F provide the greatest protection to GRSG and its habitat in MZ V and would be most likely to meet the COT report objective, which is to avoid development of infrastructure in GRSG priority areas for conservation.

Projects in the Nevada portion of MZ V that require state agency review or approval would be subject to the Nevada state plan (SETT 2014) approval and consultation process, as described under *Rights of Way*, above. Projects in the Oregon portion of MZ V that require state agency review or approval may adopt voluntary GRSG measures in the Oregon state plan (Hagen 2011), including core habitat avoidance, design features, and mitigation. However, the Oregon Sage-Grouse Action Plan currently under development will provide regulatory mechanisms for GRSG conservation on private and state lands. While the current Oregon plan is comprised of voluntary management guidelines, the guidelines may be utilized by state regulatory agencies including the Energy Facility Siting Council as conditions of approval on a case-by-case basis for certain energy projects. For example, the council has jurisdiction on wind energy projects greater than 105 MW (Dave Budeau, phone conversation with author, March 26, 2015).

The effect of the alternatives and other conservation actions in the MZ (most notably the Nevada state plan) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood rearing habitat, or other important areas that do not follow geopolitical boundaries.

Reasonably foreseeable energy development in MZ V is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private

GRSG conservation efforts as well as wind energy restrictions in the Nevada and Northeastern California Sub-region BLM and Forest Service proposed plan in MZ V would reduce the threat by restricting the type and location of developments. When restrictions in the Oregon RMPA are added to these conservation actions, the impacts of future energy developments would be further reduced. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ V by providing the greatest amount of wind exclusion in GRSG habitat. The Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site energy developments with the least impact on GRSG habitat.

Livestock Grazing and Free Roaming Equids

Nature and Type of Effects. In general, livestock can influence GRSG habitat by modifying plant biomass, plant height and cover, and plant species composition. As a result, livestock grazing could cause changes in habitat that alter species abundances and composition in GRSG insect prey. Changes in plant composition could occur in varying degrees and could change vegetative structure, affecting cover for nesting birds. Grazing could also alter fire regimes (Davies et al. 2010).

If not managed properly, cattle and sheep grazing can compact soil, remove biological soil crusts, enrich soil with nutrients, reduce vegetation cover and diversity and trample nests, directly disturbing GRSG and negatively affecting GRSG recruitment. Cattle and sheep may reduce invertebrate prey for GRSG or increase GRSG exposure to predators (Beck and Mitchell 2000, p. 998-1,000; Knick 2011; Coates 2007, p. 28-33). Grazing in riparian areas can destabilize stream flows and stream banks, cause the loss of riparian shade, and increase sediment and nutrient loads in the aquatic ecosystem (George et al. 2011). Stock watering tanks and troughs can contribute to stream and aquifer dewatering, may concentrate livestock movement and congregation in sensitive areas (Vance and Stagliano 2007), and may contribute to the increased occurrence of West Nile virus (Walker and Naugle 2011). Stock watering tanks and troughs can cause GRSG mortality if not equipped with escape ramps or covers.

However, targeted grazing can reduce seed production and populations of cheatgrass, if applied annually. The timing of the livestock grazing is critical, however, or else the livestock will consume the remnant native species along with the invasive annual grasses (BLM 2002). Targeted livestock grazing also can be used to reduce fuel load (Davies et al. 2011; Davies et al. 2010; Connelly et al. 2004, p. 7, 28-30), which can influence the behavior and effects of wildfire in sagebrush steppe and semi-desert systems under moderate or better weather conditions (Davies et al. 2010; Strand et al. 2014). As wildfire weather conditions become extreme, the potential role of grazing on wildfire behavior decreases.

Light to moderate grazing does not appear to affect perennial grasses, which are important to nest cover (Strand and Launchbaugh 2013, BLM 1997). However, excessive grazing can eliminate perennial grasses and lead to expansion of invasive plants such as cheatgrass or medusahead (Reisner et al. 2013). Unmanaged grazing can damage range resources over the long term. It often exacerbates drought effects when stocking levels are not quickly reduced to match the limited forage production. The degree to which grazing affects habitat depends on several factors, such as the number of animals grazing in an area, the time or season of grazing, and the grazing system used.

A well-developed understory of native grass, forbs, and sagebrush is critical for GRSG and some other wildlife. Impacts on habitat vary with livestock densities and distribution; the more evenly livestock is distributed across the landscape, the lower their impact on any given area (Gillen et al. 1984). However, cattle show a strong preference for certain areas, leading to high use in some areas and little to no use in others. Livestock grazing is generally limited by slopes of greater than 30 percent, dense forests and vegetation, poor or little upland forage, and lack of water.

Since the passage of the 1934 Taylor Grazing Act, range conditions on BLM-administered lands have improved due to improved grazing management practices and decreased livestock numbers and annual duration of grazing. On National Forest Systems lands, livestock grazing is administered in accordance to a number of laws and regulations, including the Multiple Use and Sustained Yield Act of 1960, Granger-Thye Act of 1950, and Organic Administration Act of 1897. As with BLM-administered lands, the Forest Service issues livestock grazing permits for a period of up to 10 years that are generally renewable if it is determined that the terms and conditions of the permit are being met and the ecological condition of the rangelands are meeting the fundamentals of rangeland health.

Although livestock grazing is the most widespread land use across the sagebrush biome, it exerts a different extent and influence on soils and vegetation than land uses that remove or fragment habitat (e.g., mineral extraction or infrastructure development). Livestock grazing influences vegetation by applying ongoing selective pressure, affecting perennial plant condition, competition, and composition (Connelly et al. 2004). Moreover, shifts in plant communities (i.e., exotic annual grass invasion and western juniper encroachment), caused in large part from historical improper (unmanaged) grazing, cannot be easily reversed through changes to grazing systems or long-term rest from grazing (Strand et al. 2014). Thus, simply reducing AUMs or acres open to grazing would not necessarily restore high quality GRSG habitat. However, if inappropriate grazing is occurring, restoring properly managed grazing practices, including potentially reducing AUMs could result in higher quality GRSG habitat.

Reducing grass height caused by livestock grazing in GRSG nesting and brood-rearing areas has been shown to negatively impact nesting success. Livestock grazing could reduce the suitability of breeding and brood-rearing habitat, which would impact GRSG populations (USFWS 2010).

For BLM-administered and National Forest System lands, Standards for Rangeland Health (BLM 1997) require the agencies to ensure that the environment contains all of the necessary components to support viable populations of sensitive, threatened, and endangered species in a given area relative to site potential. Where livestock grazing results in a level of forage use (utilization levels) determined to have detrimental effects to GRSG habitat quality, changes in grazing management that will improve or restore habitat quality will be made as soon as practical but no later than the start of the next grazing year pursuant to 43 CFR 4180.2(c). Examples of changes in management that should be considered include: temporary livestock exclusion (rest); permanent livestock exclusion; change in the season, duration, or intensity of use; fencing; and changes in salting and/or watering locations.

Barbed wire fences contribute to direct mortality of GRSG through fence collisions (Stevens et al. 2011) and may contribute to predation by acting as perches for raptors (Braun 1998).

Additional habitat modifications associated with grazing management are mechanical and chemical treatments to increase grass production, often by removing sagebrush (Knick et al. 2011). Standards for Rangeland Health protect habitat from elements detrimental to GRSG, but as discussed above not all rangelands in MZ V are in compliance with these standards. Invertebrate numbers have been positively correlated with quality of herbaceous understory in sagebrush habitat (Hull et al. 1996, Jamison et al. 2002), suggesting that managing grazing through either stocking rates (Van Poolen and Lacey 1979) or seasonal pasture rests (Mueggler 1950, Laycock 1978, Owens and Norton 1990) to increase herbage production could benefit nesting GRSG and chick survival during early brood rearing by maintaining or increasing invertebrate food sources for GRSG chicks.

Grazing infrastructure, including spring developments and water tanks and troughs, can attract livestock to previously undisturbed habitat areas. Water developments have increased the amount of sagebrush habitat available to livestock grazing by the virtue of transporting and providing water in areas where it was previously unavailable (Connelly et al. 2004). This may expand livestock grazing impacts to greater areas of sagebrush habitat, particularly uplands important for GRSG nesting, early brood-rearing, and wintering (Manier et al. 2013, p. 101). High stocking rates in water-poor areas and the associated congregation of cattle around water developments are particularly detrimental to vegetation immediately surrounding the water source (Hall and Bryant 1995, Dobkin et al. 1998), potentially reducing the available summer food source for

GRSG. GRSG likely do not regularly use livestock water developments in summer range, but instead obtain required moisture from succulent vegetation (Connelly et al. 2004). Water developments designed to provide water to adjacent succulent vegetation may benefit GRSG by providing additional summer food sources, however, these types of water developments also provide additional breeding grounds for mosquitos that carry West Nile virus (WNV, see additional discussion below) which can breed in water-filled hoof prints (Walker and Naugle 2011). Congregating cattle may also increase local impacts to GRSG including nest trampling and desertion (Beck and Mitchell 2000). Unless modified with escape ramps, developments with standing water may also contribute to direct mortality of GRSG through entrapment and drowning (Bob Hopper, phone call with author, 4/13/15).

Riparian areas and wet meadows used for brood rearing are especially sensitive to grazing by livestock (Beck and Mitchell 2000, Hockett 2002). Summer grazing in wet meadows and riparian areas can lead to reduced low-vegetative forb growth that comprise essential GRSG summer diets (Manier et al. 2013, p. 99), compromised hydrology, reduction of suitable summer habitat for GRSG, and GRSG avoidance of these areas (Beck and Mitchell 2000).

Water developments may contribute to the increased occurrence of WNV by providing suitable breeding areas for mosquitos that carry the virus (Walker and Naugle 2011). Though WNV is not a widespread threat in MZ V, GRSG are highly susceptible to WNV and suffer high rates of mortality (Clark et al. 2006; McLean 2006) and the disease has been implicated in several GRSG die-offs in the Oregon sub-region (**Section 4.2**) primarily on private rangelands (Bob Hopper, phone call with author, 4/13/15). The primary vector of WNV in sagebrush ecosystems is the mosquito *Culex tarsalis* (Naugle et al. 2004; Naugle et al. 2005; Walker and Naugle 2011). The species is dependent on the availability of warm pools of water for larval development. Artificial water sources may facilitate the spread WNV within GRSG habitats because these water developments support abundant populations of *C. tarsalis* and provide suitable breeding habitat for longer temporal periods than natural, ephemeral water sources (Walker and Naugle 2011).

Because water developments attract other animals besides livestock, they may serve as predator “sinks” for GRSG; Connelly and Doughty (1989) observed that female GRSG with broods tended to avoid water developments more than males, potentially to reduce exposure and vulnerability to predation.

As discussed, fences increase collision risk for GRSG (Stevens et al. 2011) and provide perches for predators making them a potential cause of direct mortality to GRSG (Braun 1998). Fences also contribute to habitat fragmentation (USFWS 2010). Thus fencing associated with livestock water developments, if present, may contribute to additional negative impacts on GRSG.

Impacts from wild horse and burro grazing can be similar to those from unmanaged livestock grazing, and can include impacts to riparian areas, water quality, soil and streambank erosion, and GRSG nest trampling and abandonment. Wild horses and burros also have impacts on vegetation; because of physiological differences, a horse consumes 20 to 65 percent more forage than a would a cow of equivalent body mass (Connelly et al. 2004). Comparison of sagebrush sites both occupied and unoccupied by wild horses has shown several notable differences including overall reduced vegetative cover and shifted species composition (Beever and Aldridge 2011), reduced sagebrush canopy cover, increased fragmentation of shrub canopy, reduced total number of plant species (species richness), and increased soil compaction (Bartmann et al. 1987). At higher elevations only, forb cover may be higher in areas grazed by horses (Beever 1999, Beever et al. 2003). Where wild horses and burros co-occur with cattle, the total amount of habitat that remains ungrazed by nonnative grazers will be diminished as the free-roaming equids will separate themselves spatially from cattle, utilizing steeper slopes and higher elevations (Connelly et al. 2004).

Horses also represent a unique grazing disturbance in sagebrush ecosystems neither comparable to cattle or native ungulates (Beever et al. 2003) because of their non-uniform use of the landscape, as well as their management status (horses are neither hunted nor fenced, nor seasonally rotated between pastures, etc.). Wild horses may congregate where conditions are suitable, concentrating impacts. Further, horses are one of the least selective grazers in the GRSG range (Hanley and Hanley 1982), meaning that fewer plant species may remain ungrazed in occupied areas (Beever 2003). Due to physiological differences, horses trim vegetation more closely to the ground and can delay recovery of plants (Menard et al. 2002). Further, effects of wild horse grazing may be magnified in dry years (Beever and Brussard 2000) or during periods of drought or vegetation stress (NTT 2011). Effects will be further exacerbated by wild horse and burro populations that exceed AML.

Water must also be available year-round for wild horse and burro use in HMAs and wild horse territories per the Wild and Free-Roaming Horses and Burros Act of 1971. This can result in riparian areas receiving yearlong use by wild horses and burros which contributes to degradation of these systems. Management to protect riparian areas with additional water developments and fencing can lead to detrimental impacts to GRSG as described above.

Conditions in the Sub-region and in MZ V. Livestock grazing is present and widespread on many land types including federal and private lands, across MZ V. Rangeland health assessments have found that nearly 14 percent (417,000 acres of priority habitat and 158,700 acres of general habitat) of BLM-administered grazing allotments in GRSG habitat in MZ V are not meeting wildlife standards with grazing as a causal factor (Manier et al. 2013, p. 97).

One of the most pervasive changes associated with grazing management in GRSG habitats throughout MZ V is the construction of livestock fencing (Knick et al. 2011, p. 224). The Nature Conservancy of Oregon and the BLM Burns District (BLM 2013b) conducted a study of livestock fence GRSG collision risk in the District to identify potential fences for marking, relocation, or removal. Results of the study indicate that there are 52 miles of high-risk fence in the District.

Over 56 percent (2,190,000 acres of priority habitat and 1,476,300 acres of general habitat) of GRSG habitat within MZ V is federally managed wild horse and burro range (Manier et al. 2013, p. 102). Within MZ V, 31 percent of priority habitat and 25 percent of general habitat is negatively influenced by free-roaming equids (Manier et al. 2013, p. 103). In MZ V of the Oregon sub-region, 10 designated herd management areas (HMAs) occur on BLM-administered lands (**Section 3.5**). Within MZ V, 91 percent of HMAs in priority habitat occur on BLM-administered lands, similarly 95 percent of HMAs in general habitat are on BLM-administered lands (Manier et al. 2013, p. 103). The BLM establishes an appropriate management level (AML) for each HMA, which represents the population objective. In Oregon, most of the HMAs are above AML, ranging from approximately 10 to 400 percent above AML.

Impact Analysis. **Table 5-4** lists the acres of PHMA and GHMA available and unavailable for grazing, by alternative.

Unmanaged livestock grazing, as discussed above, can have negative impacts on GRSG habitats. In contrast, well-managed grazing is compatible with GRSG habitat and can be used as a management tool to improve habitat for GRSG. Therefore, simply making GRSG habitat unavailable to grazing will not have the most benefit for the species; negative indirect impacts including fuel accumulation and wildfire risk may increase under such actions. Moreover, shifts in plant communities (i.e., invasive annual grass spread and western juniper encroachment), caused in part from historical improper grazing, cannot be easily reversed through long-term rest from grazing (Strand et al. 2014). The COT report objective for grazing is to conduct grazing management in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities for the benefit of GRSG; areas not meeting this standard should be restored (USFWS 2013a, p. 45).

Alternative C would remove livestock grazing from all occupied GRSG habitat, while Alternative F would reduce the acres of GRSG habitat that are available to grazing by 25 percent, relative to the No Action alternative. Alternative B would maintain current acres of GRSG habitat available to grazing. Alternatives D and the Proposed Plan would make unavailable for grazing certain RNAs containing GRSG habitat and not meeting rangeland health standards; Alternative D would

Table 5-4
Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-region	MZ V	Percent Within Sub-region
Available to Livestock Grazing				
Alternative A	4,620,000	49%	4,753,000	76%
Alternative B	4,620,000	49%	4,753,000	76%
Alternative C	2,344,000	0%	1,161,000	0%
Alternative D	4,570,000	49%	4,737,000	75%
Alternative E	4,620,000	49%	3,668,000	68%
Alternative F	2,344,000	0%	1,161,000	0%
Proposed Plan	4,622,000	49%	4,733,000	75%
Unavailable to Livestock Grazing				
Alternative A	19,000	100%	117,000	100%
Alternative B	19,000	100%	117,000	100%
Alternative C	2,294,000	100%	3,709,000	100%
Alternative D	69,000	100%	133,000	100%
Alternative E	19,000	100%	78,000	100%
Alternative F	0	0%	0	0%
Proposed Plan	49,000	100%	102,000	100%

Source: BLM 2015

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ V; it also displays the percentage of those acres that are found within the Sub-region.

make more RNAs unavailable to grazing than the Proposed Plan. Grazing management in GRSG habitats available to grazing are improved over the No Action alternative in Alternatives D and the Proposed Plan, by prioritizing processing of leases in grazing allotments not meeting land health standards establishing quantifiable GRSG habitat objectives, and not siting new range management structures within 1.2 miles of leks. The Proposed Plan would also prioritize review of grazing permits in SFA, and improve rangeland monitoring procedures for the benefit of GRSG habitat.

Alternative A would have fewer and more variable GRSG-specific protective grazing restrictions (see **Appendix B**, Greater Sage-Grouse Management in Existing Resource Management Plans), and would therefore have the greatest impacts on the species. Alternative C would have no areas available for livestock within with designated habitat, and would therefore have the fewest direct impacts on the species. However, as a result of restricting grazing in GRSG habitat under Alternative C, increased fencing to exclude cattle may occur. This

could result in higher cumulative effects though mortality from fence collisions. Additionally, the lack of grazing within GRSG habitat could lead to fuel buildup in native bunchgrass habitats, leading to higher probability of bunchgrass mortality during wildfire and lower resistance to invasion or dominance by annual grasses post-fire (Balch et al. 2012). The loss of permittee/lessee invasive plant control partnerships under Alternative C could further contribute to an increase in the spread of invasive annual grasses.

Since 2010, the NRCS SGI has enhanced rangeland health through rotational grazing systems, re-vegetating former rangeland with sagebrush and perennial grasses and control of invasive plants. On privately-owned lands, SGI has developed a prescribed grazing approach that balances forage availability with livestock demand. This system allows for adjustments to timing, frequency, and duration of grazing, ensuring rangelands are managed sustainably to provide continued ecological function of sagebrush-steppe. A primary focus of the prescribed grazing approach is maintenance of key plant species, such as deep-rooted perennial grasses that have been shown to be essential for ecological resistance to invasive annual grasses (Reisner et al. 2013, p. 1,047-1,048). These actions help to alleviate the adverse impacts associated with improper grazing practices outlined above under Nature and Type of Effects. Within MZ V, SGI has implemented 88,306 acres of prescribed grazing systems, mostly within priority areas for conservation. SGI has also marked 80 miles of fencing within GRSG habitat in MZ V. This program is likely the largest and most impactful program on private lands within MZ V. Because of its focus on priority areas for conservation, which often overlap PHMA, the SGI's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on GRSG when considered alongside protective BLM management actions in PHMA.

Reasonably foreseeable livestock grazing management efforts in MZ V are expected to increase over the analysis period (**Section 5.3.12**), through increased NRCS conservation actions under the Sage-Grouse Initiative (e.g., fence marking and conservation easements), state efforts to maintain ranchland, and the implementation of the Nevada and Northeastern California Sub-region BLM and Forest Service LUPA in MZ V. When grazing management within the Oregon RMPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

Under all alternatives the BLM has the authority to adjust appropriate management levels of wild horses if resource damage occurs; however, only Alternatives B, D, E, F and the Proposed Plan provide management guidelines specific to GRSG habitat (e.g., prioritizing gathers in GRSG habitat), which would benefit the species more than Alternatives A or C. Reasonably foreseeable wild horse management efforts are projected to increase over the analysis period (**Section 5.3.12**) with implementation of the Nevada and Northeastern California Sub-region BLM and Forest Service LUPA in MZ V.

Other past, present, and reasonably foreseeable future actions are unlikely to affect the threat from wild horses and burros, as these animals are federally-managed. When wild horse management within the Oregon RMPA is added to these conservation actions, this would result in a net conservation gain to GRSg habitats and populations in MZ V. Impacts may be reduced to the greatest extent under the Proposed Plan, where AMLs would be evaluated with consideration of GRSg habitat objectives for BLM-administered lands.

Conversion to Agriculture/Urbanization

Nature and Type of Effects. Converting sagebrush habitat to agricultural use causes direct loss of habitat available for GRSg. Habitat loss also decreases the connectivity between seasonal habitats, increasing population isolation and fragmentation. Fragmentation then increases the probability for decline of the population, reduced genetic diversity, and extirpation from stochastic events (Knick and Hanser 2011).

In addition to reducing the land area available to support GRSg, habitat loss and fragmentation also increase the likelihood of other disturbances, such as human activity, wildfire, predators, and invasive plant spread.

Conversion to cropland has generally eliminated or fragmented sagebrush on private lands in areas with deep fertile soils or irrigation potential. Sagebrush remaining in these areas has been limited to the agricultural edge or to relatively unproductive environments.

Although urbanized areas occur throughout the range of GRSg, the direct footprint of urbanized areas is relatively small (Manier et al. 2013, p. 31). The indirect impacts associated with urbanized areas (e.g., noise, predation, etc.) have a greater impact on GRSg populations than direct impacts; indirect impacts extend up to 4.3 miles beyond the footprint of urbanized areas. Direct and indirect impacts from urbanization suggest localized potential impacts, as opposed to widespread potential impacts as may be realized from, for example, agricultural conversion (Manier et al. 2013, p. 31).

Development of rural areas is localized, particularly along major highways and in proximity to urban centers (Knick and Connelly 2011 in Manier et al. 2013, p. 31). Though sagebrush habitats are not generally completely removed by development in rural areas (i.e., “ranchettes” or subdivision of larger ranches), resulting fragmentation, disturbance from human dwellings, and other activities likely make these remnant habitats unsuitable for GRSg (Connelly et al. 2004, p. 7-26).

Roads, railways, power lines, and communications corridors surrounding and connecting urban centers also contribute direct and indirect impacts to GRSg and GRSg habitat, including direct mortality from collision or electrocution, increased predation, habitat elimination and fragmentation, spread of invasive plants, and noise. These threats are fully described in several sections

throughout this analysis (see *Infrastructure, Energy Development and Mining, and Recreation*).

Conditions in the Sub-region and in MZ V. Regional assessments estimate that while only 1 percent of priority habitat and general habitat in MZ V are directly influenced by agricultural development, over 66 and 85 percent of priority habitat and general habitat, respectively, are within approximately 4 miles of agricultural land and are therefore negatively indirectly affected (Manier et al. 2013, p. 28).

Direct and indirect impacts from urbanization on all land ownerships affect approximately one-tenth of 1 percent of GRSG habitat in MZ V. There are only 4,800 acres of urbanized areas on private lands on priority habitat and general habitat in MZ V (Manier et al. 2013, p. 33). In comparison, there are no urbanized areas on BLM-administered surface. Private lands are the largest contributor to direct effects from this threat.

In terms of indirect influence of urbanized areas, Manier et al. (2013, p. 31) estimates that indirect impacts from urbanization extend 4.3 miles from the development footprint, representing the spatial foraging scale of avian predators that may be attracted to urban areas. Therefore, indirect impacts from private lands affect 78,300 acres (and contribute 72 percent of impacts to) GRSG habitat in MZ V. BLM-administered lands affect 23,600 acres (and contribute 22 percent of impacts to) GRSG habitat in MZ V (Manier et al. 2013, p. 33).

The COT report identifies urbanization as a threat to only one population of GRSG in MZ V; the Warm Springs population in Washoe County, in northwest Nevada (USFWS 2013a, p. 25). This population is located very close to urban areas and has experienced impacts from other threats including infrastructure, invasive plants, and wildfire (USFWS 2013a, p. 82).

Impact Analysis. The BLM and Forest Service do not convert public lands to tilled agriculture. As such, the only direct authority these agencies have over conversion to agriculture is by retaining or disposing of lands in the realty program. Lands retained under BLM and Forest Service management will not be converted to tilled agriculture and disposing of lands could increase the likelihood they will be converted to agriculture, depending on their location and new management authority. The COT report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities and to prioritize restoration.

As shown below in **Table 5-5**, acres of GRSG habitat identified for retention and disposal across MZ V are similar across all action alternatives, however, the Proposed Plan and most action alternatives slightly reduce the number of acres available for disposal in GRSG habitat in MZ V. Under the action alternatives, the BLM would generally retain GRSG habitat, thereby eliminating the possibility that GRSG habitat would be converted to agriculture use. Current land tenure

retention guidance includes retaining lands supporting threatened and endangered species and species of high interest, which would mean that GRSG habitat would be retained under the No Action alternative. Further, all action alternatives and the Proposed Plan would provide guidance to specifically consider GRSG habitat values when land is considered for sale or exchange.

Table 5-5
Acres Identified for Retention and Disposal in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-region	MZ V	Percent Within Sub-region
Acres Identified for Retention				
Alternative A	3,684,000	36%	3,406,000	67%
Alternative B	4,644,000	49%	3,407,000	67%
Alternative C	4,644,000	49%	4,836,000	77%
Alternative D	4,644,000	49%	3,407,000	67%
Alternative E	3,684,000	36%	2,799,000	60%
Alternative F	4,644,000	49%	3,407,000	67%
Proposed Plan	4,684,000	50%	4,804,000	77%
Acres Identified for Disposal				
Alternative A	19,000	68%	78,000	22%
Alternative B	7,000	0%	78,000	22%
Alternative C	7,000	0%	61,000	0%
Alternative D	7,000	0%	78,000	22%
Alternative E	19,000	68%	68,000	9%
Alternative F	7,000	0%	78,000	22%
Proposed Plan	7,000	0%	61,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ V; it also displays the percentage of those acres that are found within the Sub-region.

Land tenure adjustments require site-specific NEPA analysis, and land sales must meet the disposal criteria under applicable law. BLM land tenure adjustments are not anticipated to be a significant contributing element to the threat of agricultural conversion.

The NRCS SGI program focuses on maintaining ranchland that provides habitat for GRSG. This voluntary program provides private landowners with monetary incentives to protect GRSG habitat, often through conservation easements. As a result, private land containing GRSG habitat is protected from conversion to agriculture or other development for the life of the conservation agreement.

The conservation easements and other conservation incentives such as restoration of water features and fence marking can enhance the ability of private ranchlands to support GRSG. As of 2014, SGI has secured conservation easements on 28,871 acres within MZ V and marked or removed 80 miles of fence (NRCS 2015). This has preserved habitat and reduced the risk of direct mortality on these lands.

Over the analysis period, conversion to agriculture is expected to increase (**Section 5.3.12**), though state and private conservation efforts as well as implementation of the Nevada and Northeastern California Sub-region BLM and Forest Service LUPA in MZ V would reduce the threat. When land tenure decisions within the Oregon RMPA are added to these conservation actions, this would result in net conservation gain to GRSG habitats and populations in MZ V.

Energy Development and Mining

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing GRSG population trends. For mining, the COT report objective is to maintain stable to increasing GRSG populations and no net loss of GRSG habitats in areas affected by mining (USFWS 2013a, p. 49).

Energy development and mining within MZ V is generally limited to geothermal energy development and wind energy development. No coal or oil and gas development is presently occurring in MZ V; mining activities including for mineral materials, locatable minerals, and nonenergy minerals within the sub-region is limited, as discussed under *Mineral Materials, Locatable Minerals, and Nonenergy Leasable Minerals*, below.

Oil and Gas

Nature and Type of Effects. As discussed in **Section 4.2**, oil and gas development impacts GRSG and sagebrush habitats through direct disturbance and habitat loss from well pads, access construction, seismic surveys, roads, power lines, and pipeline corridors. Indirect disturbances result from noise, vehicle traffic, gaseous emissions, changes in water availability and quality, and human presence. These factors could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004; Holloran 2005), or influence habitat quality, predator communities, and disease dynamics (Naugle et al. 2011).

Conditions in the Sub-region and MZ V. Oil and gas development in habitats used by GRSG and construction of accompanying transmission lines, roads, and pipelines began in the late 1800s with the discovery of oil in the Interior West (Connelly et al. 2004). However, locations of geologic fields for traditional oil and gas (Copeland et al. 2013) suggest the greatest potential for oil and gas development across eastern portion of GRSG range (MZs I, II/VII, and eastern MZ III) (Manier et al. 2013, p. 51). No active oil and gas wells currently exist in

MZ V (Manier et al. 2013, p. 52), and no measurable additional acreage has been leased for fluid-mineral exploration within MZ V (Manier et al. 2013, p. 55). However, a few fluid mineral leases with no associated development currently exist in the sub-region (Tim Barnes, email with author, March 26, 2015).

No RFD scenario for oil and gas development in the Oregon Sub-region was developed for the RMPA/EIS. All future looking estimates are based on broad-scale “trends” review, as described in **Chapter 5**. The potential for impacts from oil and gas development would be reduced where areas are closed to fluid mineral leasing or where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs and BMPs (**Appendix C**, Required Design Features and Best Management Practices), the likelihood for impacts on GRSG habitat on BLM-administered lands is anticipated to be small and localized under all alternatives.

Although oil and gas activities on private lands would not be subject to BLM or Forest Service regulatory oversight, regulatory mechanisms on both federal surface and split-estate lands in MZ V would be influential should fluid mineral development occur. Development on BLM-administered split-estate lands would require mitigation for impacts on GRSG habitat on private surface lands that would not be required on lands with both privately held surface and mineral estate.

Impact Analysis. **Table 5-6** and **Table 5-7** provide a quantitative summary of fluid mineral leasing conditions on BLM-administered and National Forest System lands across MZ V, followed by an analysis of the Oregon sub-region alternatives.

Increasing demand for renewable and non-renewable energy resources is resulting in continued development within GRSG range, resulting in habitat loss, fragmentation, direct and indirect impacts, and population declines. The COT report objective for energy development is that it should be designed to ensure that it will not impinge upon stable or increasing sage-grouse population trends (USFWS 2013a, p. 43).

Alternative A (current management) leaves the greatest amount of GRSG habitat open, and Alternatives A and D would leave the least amount habitat closed, to fluid mineral development across MZ V. Generally, Alternative A provides the least protective measures for GRSG habitat across MZ V. Alternatives C and F would be the most protective of GRSG habitat by closing PHMA and GHMA to fluid mineral leasing. As such, reasonably foreseeable future leasing projects would be less likely to impact GRSG populations on federal lands. Alternatives B and E would close all PHMA to fluid mineral leasing. Alternative D would keep similar acres of GRSG habitat open and closed to leasing as the No Action Alternative, however, additional stipulations applied under Alternative D would serve to reduce impacts to GRSG relative to the No Action alternative.

Table 5-6
Acres Open and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-region	MZ V	Percent Within Sub-region
Open* to Fluid Mineral Leasing				
Alternative A	1,005,000	100%	1,627,000	100%
Alternative B	0	100%	1,627,000	<100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	952,000	100%
Alternative F	0	0%	14,000	100%
Proposed Plan	0	0%	0	0%
Closed to Fluid Mineral Leasing				
Alternative A	1,382,000	48%	1,283,000	86%
Alternative B	3,014,000	76%	1,284,000	86%
Alternative C	3,014,000	76%	3,893,000	96%
Alternative D	1,382,000	48%	1,283,000	86%
Alternative E	3,014,000	76%	1,121,000	84%
Alternative F	3,014,000	76%	3,862,000	95%
Proposed Plan	1,670,000	57%	1,334,000	87%

Source: BLM 2015

*Open with standard lease terms and conditions. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ V; it also displays the percentage of those acres that are found within the sub-region.

Table 5-7
Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-region	MZ V	Percent Within Sub-region
NSO Stipulations				
Alternative A	1,958,000	15%	365,000	100%
Alternative B	1,666,000	0%	365,000	100%
Alternative C	1,666,000	0%	0	0%
Alternative D	2,956,000	44%	463,000	100%
Alternative E	1,666,000	0%	318,000	100%
Alternative F	1,666,000	0%	0	0%
Proposed Plan	3,384,000	51%	350,000	100%
CSU/TL Stipulations				
Alternative A	334,000	100%	1,627,000	38%
Alternative B	0	0%	1,627,000	38%
Alternative C	0	0%	1,008,000	0%
Alternative D	342,000	100%	3,155,000	68%
Alternative E	0	0%	1,385,000	27%
Alternative F	0	0%	1,024,000	2%
Proposed Plan	0	0%	3,288,000	69%

Source: BLM 2015

This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ V; it also displays the percentage of those acres that are found within the sub-region.

Though fewer acres of GRSG habitat would be designated as closed under the Proposed Plan than some other action alternatives, all unleased PHMA would be managed as NSO with no waivers or modifications, unless a clear conservation gain to GRSG can be shown. Unleased GHMA would be managed as CSU/TL. Additional conditions of leasing under the Proposed Plan would include a 3 percent disturbance cap, an additional cap related to density of energy and mining facilities (not to exceed an average of one facility per 640 acres), lek buffers and seasonal restrictions, RDFs and BMPs, and comprehensive mitigation. Leased GRSG habitat would be subject to most of the conditions above under the Proposed Plan. Additionally, SFA would also be managed as NSO under the Proposed Plan, without waiver, exception, or modification. While Alternatives C and F would be the most protective of GRSG and its habitat, the Proposed Plan would substantially reduce potential impacts relative to the No Action alternative.

Restoring disturbed habitats would require the reestablishment of native shrubs and forbs, including big sagebrush, which would benefit GRSG; however, restored habitats may not support GRSG for long periods following restoration (Arkle et al. 2014). For this reason, successful restoration may not be successful without a nearby source population.

All BLM and Forest Service Proposed Plans within MZ V include BMPs and RDFs to minimize impacts on GRSG from oil and gas development on federal lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas which are already leased, BMPs can be applied as conditions of approval for development of existing leases. Similarly, state plans contain similar measures to reduce impacts. Together, these measures would help protect unfragmented habitats, minimize habitat loss and fragmentation, and maintain conditions that meet GRSG life history needs. Recent research indicates that restored habitats lack many of the features sought by GRSG in their habitat areas, and may not support GRSG for long periods following restoration activities. In order to conserve GRSG populations on the landscape, protection of existing habitat through minimizing development, would provide the best hope for GRSG persistence (Arkle et al. 2014).

Reasonably foreseeable oil and gas development is limited in the MZ. When the impacts of the Oregon RMPA are added to these actions, the impact would be a net conservation gain due in large part to implementation of NSO stipulations, anthropogenic disturbance caps, and adaptive management that would minimize future disturbances to GRSG populations and habitats.

In Nevada, new oil and gas leases or authorizations that require state agency review or approval would be subject to the permitting process and stipulations for development in GRSG Core areas under the Nevada state conservation plan for GRSG. These stipulations would benefit GRSG in Core Habitat in the MZ V portion of the sub-region by ensuring that projects avoid, minimize, and apply compensatory mitigation to reduce impacts on GRSG habitat. Oregon has also developed a state plan to achieve no net loss of GRSG core habitat from development as discussed under the *Rights-of-Way* subheading of **Section 5.3.6**. However, because measures in the plan are not currently required by a regulatory mechanism within the state, the Oregon plan may not be as protective of GRSG habitat as plans containing regulatory mechanisms for GRSG conservation on private lands, such as the Nevada state plan. These measures would be of particular benefit on privately owned (non-split-estate) surface, where BLM protective regulatory mechanisms would not apply.

The effect of the Oregon RMPA alternatives and other past, present, and reasonably foreseeable future conservation actions in the MZ (most notably the Nevada state plan) could be synergistic, meaning that the effects of the actions together is greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger

blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation benefit, especially in areas where little development has occurred to date.

Reasonably foreseeable oil and gas development in MZ V is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private GRSG conservation efforts as well as the Nevada and Northeastern California Sub-region BLM and Forest Service proposed plan in MZ V would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Oregon RMPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ V by providing the greatest amount of GRSG habitat closed to leasing. The Proposed Plan would also reduce the threat to a lesser degree through additional conservation measures.

Geothermal

Nature and Type of Effects. Impacts to GRSG from geothermal development are not well documented since geothermal development has been too recent to identify any immediate or lag effects (Knick et al. 2011 in Manier et al. 2013, p. 70). However, geothermal development is similar to oil and gas development and direct impacts to habitats would occur from development of power plants, access roads, pipelines and transmission lines. As a result, impacts of geothermal developments to GRSG from direct habitat loss, habitat fragmentation via roads and transmission lines, noise, and increased human presence (Connelly et al. 2004) may be similar to those discussed for nonrenewable energy development. Comparable effects on local GRSG populations are also anticipated (Manier et al. 2013, p. 70). Other concerns related to geothermal energy development include air and water pollution, disposal of hazardous waste, land subsidence, and release of toxic gases into the environment (Manier et al. 2013, p. 70).

Conditions in the Sub-region and MZ V. Current geothermal energy production within the GRSG range is primarily within MZs III, IV, and V. Approximately 10,900 acres of geothermal leases on priority habitat and 31,800 acres of leases on general habitat currently exist in MZ V (Manier et al. 2013, p. 71). This acreage represents less than 1 percent of total GRSG habitat in the MZ.

No geothermal wells have yet been developed on BLM-administered lands in the sub-region. However, BLM issued a Finding of No Significant Impact in July 2013 to permit geothermal exploration and production wells on BLM-administered lands in Lake and Harney Counties (**Section 3.11, Table 5-1**). Limited geothermal development has occurred on private lands in the sub-region (Tim Barnes, email with author, March 26, 2015).

The RFD scenario for leasing and developing geothermal resources in the Oregon Sub-region is based on the RFD scenario described in **Section 4.1.1**,

Analytical Assumptions, of the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (BLM and Forest Service 2008; the RFD scenario was created for a different analysis and not this RMPA/EIS). Additional information on this Final EIS is provided on the BLM website at http://www.blm.gov/wo/st/en/prog/energy/geothermal/geothermal_nationwide/Documents/Final_PEIS.html.

All of central and eastern Oregon are designated as Moderate or High potential for geothermal energy, and under the RFD scenario, the Oregon Sub-region is projected to develop 1,250 MW of geothermal energy by 2025. Based on the assumption that a typical geothermal plant will be capable of producing approximately 50 MW, this suggests that 25 geothermal energy plants will be developed. The RFD scenario gives typical disturbances for these facilities as between 53 and 367 acres; this would suggest that between 1,325 and 9,175 acres of disturbance associated with geothermal energy plants will occur, throughout the sub-region, on BLM lands. The conservative assumption that all 9,175 acres of disturbance would be located within MZ V, on PHMA, would mean that one-tenth of 1 percent of PHMA within MZ V would be directly affected. It is reasonable to assume that not all 9,175 acres of disturbance would occur within GRSG habitat, however, indirect impacts from such development would affect a considerably larger area than the direct footprint of development, as discussed for several threats above. Typical geothermal development includes roads, transmission lines, and associated linear features in addition to power plant development, and as discussed above these features may contribute to spread of invasive plants, habitat fragmentation, and increased predation on GRSG.

The potential for impacts from geothermal development would be reduced where areas are closed to leasing and where stipulations are applied. Given the relatively small acreage of projected geothermal development, and implementation of the disturbance cap, stipulations, RDFs and BMPs (**Appendix C**, Required Design Features and Best Management Practices), and mitigation, the likelihood for impacts on GRSG habitat on BLM-administered and National Forest System lands is anticipated to be small and localized under all alternatives.

Impact Analysis. Increasing demand for renewable and non-renewable energy resources is resulting in continued development within GRSG range as described above under *Oil and Gas*. The COT report objective for geothermal energy development is the same as conventional oil and gas energy development, since the nature and types of impacts resulting from these types of development are similar.

The BLM NOC did not compile an MZ-wide dataset for this threat. Therefore, the cumulative effects analysis for geothermal energy development within MZ V will be qualitative (see **Section 5.3.1**, Methods). However, the RDF scenario

described under *Conditions in the Sub-region and MZ V* does provide an estimate of projected geothermal development in the sub-region.

The quantitative analysis of effects from geothermal leasing would be the same as described for oil and gas because allocations and past, present, and reasonably foreseeable future actions would be the same.

Coal

Conditions in the Sub-region and MZ V. There are currently no direct or indirect effects from surface coal leases in the MZ (Manier et al. 2013, p. 74). There is no coal development in the sub-region (**Section 3.1.1**); thus this threat will not be described further in this document.

Mineral Materials, Locatable Minerals, and Nonenergy Leasable Minerals

Nature and Type of Effects. Development of surface mines (for sand, gravel and other common mineral materials found in MZ V) may negatively impact GRSG numbers and disrupt the habitat and life-cycle of the species, similar to other types of mining activities (Braun 1998; Manier et al. 2013, pp. 70-71). Locatable minerals include gold, silver, uranium, and bentonite. Activities associated with locatable mineral development, such as stockpiling topsoil and extracting and transporting material, would cause mortality and nest disruption. These actions also would reduce the functionality of the surrounding habitat with noise and light disturbance, resulting in lost and degraded GRSG habitat. Nonenergy leasable minerals are materials such as sulfates, silicates, and trona (sodium carbonate). Impacts on GRSG from nonenergy leasable mineral management are similar to those from other types of surface mining.

Conditions in the Sub-region and in MZ V. There are 111,400 acres of mining sites for mineral materials and locatable minerals on BLM-administered surface land on priority habitat and general habitat in MZ V (Manier et al. 2013, p. 78). This total does not include minerals mined as energy sources. There are 119,300 acres of mining sites across all landownership types, making BLM-administered land the largest contributor to potential direct effects from this threat (82 percent of potentially affected priority habitat and 74 percent of potentially affected general habitat, respectively, are on BLM-administered lands). National Forest System lands do not contribute to direct effects on priority habitat and general habitat (Manier et al. 2013, p. 78).

GRSG may be directly impacted by mining and mineral materials disposal sites by being in the path of development; however, indirect impacts on habitat affect a much larger area than direct impacts. Manier et al. (2013, p. 77) estimates that indirect impacts from this type of development extend 1.5 miles from the development footprint. Therefore, direct and indirect impacts taken together affect 800,900 acres of priority habitat and general habitat on BLM-administered lands in MZ V. National Forest System lands indirectly affect only 1,500 acres of GRS habitat in MZ V (Manier et al. 2013, p. 78).

The mineral materials currently being developed for commercial purposes in the Oregon sub-region include clay, cinders, sand and gravel, crushable rock, and facing stone (**Section 3.13**). Current locatable mineral exploration and production is generally limited to central Oregon. In BLM-administered areas managed as open to locatable mineral exploration and development, minerals of commercial interest include diatomaceous earth, limestone, perlite, sunstone, bentonite, and gold (**Section 3.12**). Other locatable minerals are known to exist in the sub-region, but they are currently uneconomical to produce. Existing leases for nonenergy leasable minerals represent a relatively small threat spatially across the range of GRSG (Manier et al. 2013, p. 71). No current nonenergy leasable development is present in MZ V (Manier et al. 2013, p. 71). There is currently no commercial interest in nonenergy leasable minerals in the sub-region (**Section 3.14**).

The final COT report identifies mining as a “present and widespread” threat to the Central Oregon GRSG population (USFWS 2013a, p. 25). However, no examples of mining-related threats are presented in the narrative for this population (USFWS 2013a, p. 80). This threat was changed from “slight threat” in the previous draft of the COT report, likely as a result of the consolidation of threat categories from the draft to final report (David Budeau, email with author, March 26, 2015), not as a result of actual increased threat. Communication with geologist Tim Barnes at the BLM’s Prineville District Office confirms that the threat from mineral mining in the Central Oregon population area is present but localized. Mining operations in this area are small; are widely spaced across the population area; are generally limited in size to less than 5-10 acres; operate on a seasonal basis; are focused mostly on fluvial plains or terraced alluvial systems, and/or are small, casual use activity or recreational mining claims operated by individuals (Tim Barnes, phone call with author, March 25, 2015). There are no large commercial minerals operations on BLM lands in the population area; existing pits/quarries are limited to established community pits (where small amounts of material are sold or granted), county sites, and Federal Highway Administration ROW pits, and no large scale commercial operations are expected (Tim Barnes, email with author, March 26, 2015).

The information above suggests that while mining is present in the Central Oregon population area, potential direct and indirect impacts from mining are lower than indicated in the final COT report. The potential for larger, economic-scale operations may exist for uranium and underground gold. However, these potential operations are either outside of the Central Oregon population area (uranium) or are located on private land (gold). Further, the BLM has not received any notices or plans indicating that these mines are currently or will be developing plans of operation (Tim Barnes, phone call with author, March 25, 2015). Finally, no other GRSG populations in WAFWA MZ V are associated with a “present and widespread” rating for mining (USFWS

2013a, p. 25). Therefore, the threat of mining within MZ V will not be further analyzed in this CEA.

Recreation

Nature and Type of Effects. Recreation, such as camping, bicycling, wildlife viewing, horseback riding, fishing, and hunting, can be dispersed; concentrated, such OHV use and developed campsites; and permitted, such as via BLM Special Recreation Permit and Forest Service Recreation Special Use Permit Authorization (RSUA). The BLM also manages Special Recreation Management Areas (SRMAs) where recreation is a primary resource management consideration.

Recreation on federally-administered lands that use the extensive network of double-track and single-track routes have an impact on sagebrush and GRSG. Ecological impacts of roads and motorized trails include mortality due to collisions; behavior modifications due to noise, human activity, and habitat loss; alteration of the physical environment; nutrient leaching; erosion; invasive plants spread; increased use; and alteration by humans due to accessibility (Knick et al. 2011, p. 219). Generally, road-effect distances (the distance from a road at which a population density decrease is detected) are positively correlated with increased traffic density and speed (Foreman and Alexander 1998). Recreational activities can degrade GRSG habitat through direct impacts on vegetation and soils, introduction or spread of invasive plants, and habitat fragmentation. This occurs in areas of concentrated use, trailheads, staging areas, and routes and trails. However, road access is critical to facilitate wildfire suppression response, thereby preserving intact vegetation and preventing further fragmentation.

Motorized activities, including OHV use, are expected to have a larger footprint on the landscape. They are anticipated to have the greatest level of impact due to noise levels, compared to nonmotorized uses, such as hiking or equestrian use. Cross-country motorized travel, which is permitted in designated areas on BLM-administered lands but not National Forest System lands, would increase the potential for soil compaction, perennial grasses and forbs loss, and reduce sagebrush canopy cover. Losses in sagebrush canopy could be the result of repeated, high frequency, cross-country OHV use over long periods. In addition, the chances of wildfire are increased during the summer, when wildfire danger and recreational uses are at high levels.

Dispersed uses expand the human footprint. Closing areas to recreation and reclaiming unused, minimally used, or redundant roads in and around sagebrush habitats during seasonal use by GRSG may reduce the footprint and presumably impacts on wildlife. Restricting access to important habitat areas during seasonal use (lekking, nesting, brood-rearing, and wintering) may decrease the impacts associated with humans. However, access restriction will not eliminate other impacts, such as invasive plant spread, predator movements, cover loss, and erosion (Manier et al. 2013, p. 108).

Conditions in the Sub-region and in MZ V. Human populations have increased and expanded, primarily over the past century and in the western portion of the sagebrush distribution (Knick et al. 2011, p. 212). With these expanding populations come greater human impacts (Leu et al. 2008), including from recreational uses of BLM and National Forest System lands. Uninhabited areas within the Great Basin ecoregion (MZs III and V) decreased 90 percent (from 22.2 million acres to less than 3 million acres) with expansion driven in part by economic and recreation opportunities in the region (Torregrosa and Devoe 2008, p. 10).

The COT report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal GRSG behavior (USFWS 2013a, p. 49). Limits on road use under the action alternatives and limits on OHVs would help meet these objectives.

In the Oregon sub-region, the BLM has designated all BLM-administered lands as open, limited, or closed to OHV travel. This has resulted in the implementation of a system of designated roads and trails whereby cross-country travel is only allowed in specified areas; however, most areas in Oregon are currently designated open. Similarly, the Forest Service has published Motor Vehicle Use Maps for nine National Scenic Areas, National Grasslands, and National Forests in the sub-region. The remaining four National Forests are currently undergoing travel management planning (**Section 3.9**).

Impact Analysis. **Table 5-8** shows acres of travel management designations in GRSG habitat in MZ V.

Recreational activities within GRSG habitat can result in habitat loss and fragmentation and direct and indirect disturbance. The COT report objective for recreation is to maintain healthy native sagebrush communities and manage direct and indirect human disturbance (including noise) to avoid impacts to GRSG (USFWS 2013a, p. 49). Limits on road use under the action alternatives and limits on OHVs would help meet these objectives.

As shown in **Table 5-8**, there are slight variations among alternatives in the amount of acres closed and limited to motorized vehicles in both PHMA and GHMA. All action alternatives would reduce acres open in GRSG habitat; acres open in PHMA would be zero for all action alternatives, while acres open in GHMA would be unchanged in Alternatives B, D, and F, reduced by half in Alternative E, and reduced to zero under Alternative C and the Proposed Plan. Therefore Alternative C and the Proposed Plan would go furthest in reducing open acres in GRSG habitat, and would therefore reduce impacts from travel management planning the most, while impacts under the No Action alternative would be the greatest.

Table 5-8
Acres of Travel Management Designations in GRSG Habitat in MZ V

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ V	Percent Within Sub-region	MZ V	Percent Within Sub-region
Open				
Alternative A	1,217,000	1%	1,720,000	100%
Alternative B	0	0%	1,719,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	1,719,000	100%
Alternative E	0	0%	860,000	100%
Alternative F	0	0%	1,719,000	100%
Proposed Plan	0	0%	0	0%
Limited				
Alternative A	3,238,000	32%	2,964,000	63%
Alternative B	4,454,000	51%	2,964,000	63%
Alternative C	4,454,000	51%	4,685,000	77%
Alternative D	4,454,000	51%	2,964,000	63%
Alternative E	4,464,000	51%	2,759,000	60%
Alternative F	4,454,000	51%	2,964,000	63%
Proposed Plan	4,469,000	51%	4,652,000	76%
Closed				
Alternative A	220,000	20%	215,000	61%
Alternative B	220,000	20%	215,000	61%
Alternative C	220,000	20%	215,000	61%
Alternative D	220,000	20%	215,000	61%
Alternative E	210,000	17%	154,000	46%
Alternative F	220,000	20%	215,000	61%
Proposed Plan	247,000	29%	215,000	61%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within travel management designations of open, limited and closed in MZ V; it also displays the percentage of those acres that are found within the sub-region.

For recreation, Alternatives B, D, F, and the Proposed Plan would aim to reduce impacts on GRSG with issuance of SRPs where the effects of recreation were neutral or beneficial to GRSG habitat. Alternatives A and C lack specific management direction for GRSG or GRSG habitat, and would therefore have the greatest impact on GRSG. Alternative E also lacks a specific recreation plan for GRSG, however, cross-country motorized travel would be seasonally

prohibited and limited to existing routes in Core Area and Low Density habitat. Thus, this alternative would reduce impacts of recreation on GRSG relative to other action alternatives and the No Action alternative.

Reasonably foreseeable recreation in MZ V is expected to increase over the 20-year analysis period (**Section 5.3.12**). However, state and private GRSG conservation efforts as well as the Nevada and Northeastern California Sub-region BLM and Forest Service proposed plan in MZ V would reduce the threat by providing additional protections such as disturbance caps and limitations on National Forest System lands. When restrictions within the Oregon RMPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V.

5.3.7 Existing Conditions in WAFWA MZ IV

This section summarizes existing conditions and past and present actions for the Oregon sub-region (provided in more detail in **Chapter 3**) and for MZ IV as a whole. Reasonably foreseeable future actions are discussed in **Section 5.3.9**.

GRSG Habitat and Populations

MZ IV consists of nine GRSG populations: Baker, East-Central, Southwest Montana, Snake-Salmon-Beaverhead, Belt Mountains, Weiser, Northern Great Basin, Box Elder, and Sawtooth (Garton et al. 2011). The Oregon sub-region includes two of these populations: Baker and Northern Great Basin. This zone represents one of the largest areas of connected GRSG habitat, as demonstrated by Knick et al. (2011), and supports the largest population of GRSG outside of the Wyoming Basin (Garton et al. 2011). MZ IV includes GRSG populations in Oregon, Idaho, Nevada, Utah and Montana.

In MZ IV, BLM-administered and other federal lands account for approximately 22,522,300 acres of GRSG habitat (approximately 68 percent of habitat), with state and private lands accounting for over 10 million acres of GRSG habitat (approximately 31 percent of habitat) (Manier et al. 2013, p. 118). The BLM also has some management authority over split-estate lands, with BLM-administered federal mineral estate and privately held surface ownership. The higher percentage of GRSG habitat on BLM-administered and other federal land means BLM and Forest Service management could play a key role in alleviating threats to GRSG in MZ IV.

Table 5-9 provides a breakdown of land ownership and acres of GRSG habitat in MZ IV adapted from Manier et al. (2013, p. 118). As the table shows, approximately 52 percent of priority habitat and 19 percent of general habitat is on BLM-administered lands. Approximately 7 percent of priority habitat and 5 percent of general habitat is on National Forest System lands.

Table 5-9
Management Jurisdiction in MZ IV by Acres of Priority and General Habitats

	Total Surface Area (Acres)	Priority Habitat (Acres)	General Habitat (Acres)	Non-habitat (Acres)
MZ IV	78,259,200 (100%)	21,930,600 (28%)	10,958,500 (14%)	45,370,100 (58%)
BLM	26,220,300 (34%)	13,710,700 (63%)	4,928,200 (45%)	7,581,400 (17%)
Forest Service	22,291,600 (28%)	1,613,800 (7%)	1,113,500 (10%)	9,564,300 (21%)
Tribal and other federal	2,431,000 (3%)	633,600 (3%)	522,500 (5%)	1,274,900 (3%)
Private	23,150,400 (30%)	4,890,200 (22%)	3,516,700 (32%)	14,743,500 (33%)
State	3,681,000 (5%)	1,019,400 (5%)	846,200 (8%)	1,815,400 (4%)
Other	484,800 (<1%)	62,900 (<1%)	31,400 (<1%)	390,500 (1%)

Source: Manier et al. 2013, p. 118

Population Trends in Management Zone IV

Historic disturbances to the sagebrush landscape including conversion of habitat to agriculture, wildfire, invasive plants, and development, have resulted in a residual sagebrush landscape that is less intact and productive than those prior to European colonization. As a result, more known populations in the region are relatively small and/or separated from adjacent populations. Notable exceptions are the Snake-Salmon-Beaverhead and Northern Great Basin populations (Manier et al. 2013, p. 132). Garton et al. (2011) predicted a 10.5 percent chance this MZ will fall below 200 males by 2037, and a 39.7 percent chance it would fall below 200 males by 2107 (USFWS 2013a, p. 75).

The Snake-Salmon-Beaverhead and Northern Great Basin populations encompass the largest number of occupied leks in the MZ. The Northern Great Basin population is especially important to long-term conservation of GRSG in MZ IV and is one of the two remaining major population strongholds in the range of the species (Connelly et al. 2004). The Snake-Salmon-Beaverhead population provides known connectivity with the Southwest Montana population area. Conversely, MZ IV also contains less resilient populations at higher risk of extirpation (USFWS 2013a). The Baker population is the smallest extant population in the state of Oregon and has little connectivity with other populations due to habitat and topography barriers.

GRSG populations change cyclically. For example, the GRSG population in Montana declined sharply from 1991 to 1996, before increasing through 2000 (Montana Sage Grouse Working Group 2005). The population is thought to be down 33 percent from historic levels. Between 2004 and 2013, the average

number of displaying males per lek in a given year in Montana ranged from 7 to 19 (Greater Sage-Grouse Habitat Conservation Advisory Council 2014).

5.3.8 Regional Efforts to Manage Threats to GRSG in MZ IV

Regional efforts include past, present, and reasonably foreseeable actions conducted by the BLM and by other federal and/or in cooperation with non-federal agencies, organizations, landowners, or other groups in MZ IV. These efforts may have a strong influence in alleviating threats to GRSG than BLM and Forest Service actions alone. This is because state and private lands account for approximately 10 million acres (approximately 31 percent) of GRSG habitat in MZ IV (Manier et al. 2013, p. 118). The boundaries of MZ IV encompass portions of the states of Idaho, Montana, Utah, Nevada, Oregon, and Wyoming. Regional efforts occurring in these states are also discussed below.

Other BLM and Forest Service Planning Efforts

The BLM and Forest Service have incorporated management of SFA into their proposed management approach for GRSG, as described in **Section 5.3.4**. There are three SFA comprising 7,886,000 acres in MZ IV as a whole. The North-Central Idaho SFA (2,629,400 acres) and the Southern Idaho/Northern Nevada SFA (4,198,900 acres) are entirely within MZ IV. The Southeast Oregon/North-Central Nevada SFA is mostly within MZ IV (1,057,700 acres) though a 683,200-acre portion is within MZ V.

Other BLM and Forest Service planning efforts are described in **Section 5.3.4**.

Idaho Statewide Efforts

Similar to efforts in nearby states, the governor of Idaho is expected to issue an executive order providing direction for GRSG conservation in Idaho on state lands. This executive order is expected to be largely consistent with BLM and Forest Service direction in the GRSG RMPAs/LUPAs, though exact details are not known and are speculative as of the time this FEIS is published.

Idaho Department of Lands prepared the Proposed Greater Sage-Grouse Conservation Plan (IDL 2015). Released in February 2015, and complementing Idaho Governor Otter's proposed plan (Alternative E of the Draft Idaho and Southwest Montana LUPA/EIS), the draft plan focuses on three primary threats to GRSG in Idaho: wildfire, infrastructure, and invasive plants. The plan outlines enforceable stipulations in leases, permits, and easements on IDL lands. Conservation measures in the plan will be used as BMPs for activities supporting wildfire prevention, suppression, and rehabilitation, regulating oil and gas development, some mining activities, and abandoned mine reclamation. While the plan is comprised of voluntary management guidelines, the guidelines may be utilized by state regulatory agencies for projects requiring agency review or approval.

The Idaho Sage-grouse Advisory Committee prepared their Conservation Plan for the Greater Sage-grouse in Idaho (Idaho Sage-grouse Advisory Committee

2006) to provide guidance, tools, and resources to GRSG Local Working Groups, and to facilitate and provide statewide consistency between Local Working Group plans. The plan identifies 19 threats to GRSG and GRSG habitat and presents conservation measures to address each of those threats. Rural Fire Protection Districts have been established within the state to help suppress wildfires in GRSG habitat and to facilitate development of their local plans.

Montana Statewide Efforts

The Montana Department of Fish, Wildlife and Parks (MFWP) is tasked with implementing the range-wide WAFWA Sage-Grouse Strategy (Stiver et al. 2006) in Montana. The WAFWA Sage-Grouse Strategy monitors, researches, provides outreach, and funds conservation projects for GRSG. A basic premise of the WAFWA Sage-Grouse Strategy is that additional conservation capacity must be developed at all local, state, federal, and range-wide levels for both the short term (3 to 5 years) and for the long term (10 years or more) to ensure GRSG conservation.

In addition, the MFWP's Montana Management Plan and Conservation Strategy for Sage-Grouse was initiated in 2005 to protect, maintain, and restore GRSG habitat. The plan ranks threats to the species across the state and provides an overall strategy for public and private cooperation in conservation actions. In 2013, the governor established the Greater Sage-Grouse Habitat Conservation Advisory Council to provide recommendations on policies and actions for GRSG conservation and provide regulatory authority for conservation actions. The council provided these recommendations in January 2014. The governor subsequently issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for future GRSG conservation in Montana.

Montana Executive Order. The Montana governor issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for GRSG conservation in Montana. Stipulations for development in the executive order and Montana Management Plan and Conservation Strategy for Sage-Grouse include but are not limited to:

- A 0.6-mile NSO buffer around the perimeter of active leks for new activities
- Locating new overhead power lines and communication towers a minimum of 0.6 mile from the perimeter of active leks
- A minimum 2.0-mile buffer from active lek perimeters for main roads and a minimum 0.6-mile buffer for facility site access roads
- A 5 percent limit on anthropogenic surface disturbance within the Density and Disturbance Calculation Tool examination area (based upon suitable habitat)

- As authorized by permitting agency or agencies, activities (production, maintenance and emergency activity exempted), will typically be prohibited from March 15 through July 15 outside of the NSO perimeter of an active lek and within 2 miles of that perimeter in Core Population Areas where breeding, nesting, and early brood-rearing habitat is present

The approach of the Montana executive order/Montana Management Plan and Conservation Strategy for GRSG is similar to the Wyoming executive order. Montana's plan will apply a disturbance cap in core habitat and will limit well density and apply timing limitations. The 0.6-mile buffer would protect males in the vicinity of leks during the breeding season; the density limits and disturbance cap would protect GRSG during nesting, brood-rearing, and winter concentration activities. The timing restrictions would reduce the potential for displacement or disruption during the breeding season.

Utah Statewide Efforts

The UDWR developed a *Conservation Plan for Greater Sage-Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013). The conservation plan identifies 11 population areas in Utah that are the focus of GRSG conservation efforts, and helps coordinate the efforts of ten local working groups in the state. The goal of the *Conservation Plan for Greater Sage-Grouse in Utah* is to protect, maintain, improve and enhance GRSG populations and habitats on public and private lands within established SGMAs (population areas). It includes conservation strategies and measurable objectives regarding populations and habitat, including a 5 percent permanent disturbance limit (as of April 2013), and through Utah Executive Order EO/2015/002 (see below), provides a regulatory mechanism to preserve GRSG through specific restrictions on public or private land use.

On February 25, 2015, Utah Governor Gary Herbert signed Utah Executive Order EO/2015/002. The Executive Order directs state agencies whose actions may affect GRSG to implement Utah's *Conservation Plan for Greater Sage-Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013) in GRSG population areas identified in the 2013 Conservation Plan.

Earlier efforts in Utah included formation of Utah's Sage-Grouse Plan Committee, comprised of members from public and private entities, which prioritized threats to the species across the state in Utah's Greater Sage-Grouse Management Plan (2009). The plan sought to protect and maintain occupied habitat, while restoring 175,000 acres of habitat by 2014. The plan provided an overall strategy for local working groups to use in implementing conservation actions, while providing annual updates detailing those actions taken for specific strategies identified in each plan. One recent accomplishment report for the Strawberry Valley Adaptive Resource Management Area reported that 10,223 acres had been purchased within the Management Area by

the Utah Reclamation and Mitigation Commission (Strawberry Valley Adaptive Resource Management Local Working Group 2006).

Oregon Statewide Efforts

Oregon statewide efforts are described in **Section 5.3.4**, Regional Efforts to Manage Threats to GRSG in MZ V.

Nevada/California Statewide Efforts

Nevada and California statewide efforts are described in **Section 5.3.4**, Regional Efforts to Manage Threats to GRSG in MZ V

Wyoming Statewide Efforts

Though several statewide efforts to conserve GRSG exist in Wyoming, including the Wyoming Executive Order and the Wyoming Sage-Grouse Working Group, these efforts will not be discussed further in this CEA due to the very small amount of GRSG habitat in Wyoming that falls within MZ IV, and the correspondingly small or negligible affect Wyoming statewide efforts would play in GRSG conservation in MZs IV and V, respectively.

Natural Resource Conservation Service Sage Grouse Initiative

The Natural Resource Conservation Service's (NRCS) Sage Grouse Initiative (SGI) is described in **Section 5.3.4**, Regional Efforts to Manage Threats to GRSG in MZ V. SGI efforts in MZ IV are described here.

As of 2014, the most recent year for which data are available, SGI has secured conservation easements on 98,167 acres within MZ IV (NRCS 2015). On these and additional private lands, SGI has completed other GRSG conservation actions within MZ IV, including implementation of grazing systems, conifer removal, vegetation seeding, and fence marking. These conservation actions are targeted at the critical threats in each MZ, consistent with those outlined in the COT report. SGI clusters implementation to achieve landscape benefits.

Other Regional Efforts

A programmatic EIS by the Western Area Power Administration (WAPA) and the USFWS for the entire upper Great Plains (including portions of MZ IV) will focus future wind energy developments in specific corridors outside of GRSG core habitat (WAPA 2013). In accordance with Section 7 of the ESA, preparation of the programmatic EIS has involved consultation between cooperating entities and the USFWS and preparation of a programmatic Biological Assessment to ensure that the action will not jeopardize the continued existence of any federally-listed species, including the federal candidate GRSG. At the time of this RMPA specific conservation measures for protecting GRSG and its habitat under the programmatic EIS are not developed.

Tribes, counties, and local working groups are playing a critical role in promoting GRSG conservation at the local level. Individual conservation plans have been prepared by most local working groups to develop and implement

strategies to improve or maintain GRSG habitat and reduce or mitigate threats on the local level. The proposed conservation actions and recommendations in these plans are voluntary actions for private landowners.

Local working group projects have included monitoring, research, and mapping habitat areas, as well as public outreach efforts, such as landowner education and collaboration with federal, state, and other local entities.

Some local working group conservation plans recommend restricting resource uses as well. For example, the Big Desert Sage-Grouse Conservation Plan (Big Desert Sage-grouse Local Working Group 2010) limiting recreational OHV use to existing designated roads and trails. Local working group GRSG conservation plans in MZ IV include the following:

- North Magic Valley Conservation Plan (2011)
- West Central Conservation Plan (2010)
- East Idaho Uplands Conservation Plan (2011)
- Big Desert Conservation Plan (2010)
- Shoshone Basin Conservation Plan (2008)
- Jarbidge Conservation Plan (2007)
- Curlew Valley Conservation Plan (2004)
- Owyhee County Conservation Plan (2013)
- Upper Snake Conservation Plan (2009)
- Challis Conservation Plan (2010)
- Vale Conservation Plan (2005)
- Baker Conservation Plan (2005)
- Burns Conservation Plan (2005)
- Dillon Conservation Plan (2011)
- West Box Elder Conservation Plan (2006)
- Cache/East Box Elder (2006)
- North Central Nevada Conservation Plan (2004)
- Northeastern Nevada Conservation Plan (2004)

5.3.9 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Oregon RMPA and alternatives in combination with other past, present, and reasonably foreseeable future federal and non-federal actions on lands in MZ IV (see **Table 5-22**). Where these actions occur within GRSG habitat, they would cumulatively add to the impacts of BLM- and Forest Service-authorized activities

set forth in the Oregon RMPA. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, state, private, or mixed land ownership in MZ IV are described in the Proposed LUPAs for Nevada and Northeastern California, Idaho and Southwestern Montana, and Utah, which are incorporated by reference.

The following list includes past, present, and future actions in MZ IV that when added to the Proposed Plan and alternatives for the Oregon Sub-region could cumulatively affect GRSG:

- Gateway West 230/500 Transmission Line Project, Wyoming and Idaho
- Boardman to Hemingway Transmission Line Project, Oregon and Idaho
- Fuels and vegetation treatments throughout the MZ
- Grazing permit renewals and allotment management plan updates throughout the MZ
- China Mountain Wind Project, Nevada and Idaho
- Small mining projects throughout the MZ

5.3.10 Threats to GRSG in Management Zone IV

In its COT report, the USFWS identifies wildfire, spread of invasive plants, conifer encroachment, infrastructure development, livestock grazing and free-roaming equids, conversion to agriculture, energy development, and recreation as the present and widespread threats facing GRSG in MZ IV (USFWS 2013a, pp. 22-24). Each threat is discussed below.

For those threats below that are analyzed quantitatively (infrastructure, livestock grazing, conversion to agriculture, energy development and mining, and recreation), acres presented in the analyses tables represent acres of land allocations from each of the Oregon Sub-region RMPA/EIS alternatives in the Oregon sub-region portion of MZ IV, combined with acres of land allocations from the Proposed Plans of additional BLM and Forest Service sub-regions in the non-Oregon sub-region portion of MZ IV. Additional sub-regions and Sub-regions within MZ IV include Idaho and Southwestern Montana, Utah, Nevada and Northeastern California, Lewistown, and 9-Plan. The percentages in the tables represent the relative contribution of each Oregon sub-region alternative to the total allocation in the MZ.

Wildfire

Nature and Type of Effects. The impacts of wildfire on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Wildfire is a primary threat to GRSG habitats and populations across MZ IV, with 81 percent of priority habitat

and general habitat being at high risk for wildfire, including the Snake-Salmon-Beaverhead and Northern Great Basin populations (Manier et al. 2013, p. 133). Since 2000, more than 4.9 million acres (14 percent of priority habitat and 17 percent of general habitat) of GRSG habitat have burned in this MZ, with an average of more than 239,000 acres of priority habitat burned annually; more than 1 million acres burned in some years (Manier et al. 2013, p. 133). The Murphy Fire in southern Idaho and northern Nevada affected over 650,000 acres of habitat in this MZ in 2007 (USFWS 2013a, p. 78). In 2012, the Miller Homestead and Long Draw fires in southeastern Oregon burned 160,800 and 558,200 acres, respectively, mostly on BLM-administered lands with significant losses of GRSG habitat (BLM 2013c).

The use of chaff and flares by the military may increase wildfire risk, but this risk is generally mitigated by release altitudes about 2,000 feet above ground level and only above 5,000 feet above ground level during fire risk categories 4 and 5 (Mountain Home Air Force Base 2012).

Impact Analysis. Management actions that emphasize wildfire suppression in GRSG habitat would benefit the species by limiting habitat loss in the event of wildfire. Under current management (Alternative A), prescribed burning may be used to achieve habitat objectives. Alternatives B through F and the Proposed Plan provide for similar protection and maintenance of sagebrush habitat in implementing prescribed burning. The action alternatives all prioritize sagebrush protection in fuels treatment programs and would provide superior protection for sagebrush in prescribed burning, fuels treatment and wildfire suppression. Under Alternative D and the Proposed Plan, the inter-agency Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment (Fire and Invasive Assessment Tool (FIAT 2014)) would prioritize landscapes for wildfire prevention and suppression, fuels management, and habitat restoration and rehabilitation within key GRSG habitats based on resistance and resilience concepts in Chambers et al. (2014). This is in accordance with the COT report objective to retain and restore healthy native sagebrush plant communities within the range of GRSG.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit GRSG in the event of an unplanned wildfire. The Montana executive order emphasizes wildfire suppression in core population areas, while recognizing other suppression priorities may take precedent. The Utah executive order directs the Utah Division of Forestry, Fire, and State Lands to prioritize fuels reductions activities within or near GRSG Management Areas. These actions would benefit GRSG during wildfire planning and response, particularly on lands not administered by the BLM or Forest Service.

On the local level, the Owyhee County Sage-Grouse Conservation Plan (2013) recommends reseeding burned areas with sagebrush and implementing sagebrush restoration projects in historical GRSG habitat where historical

wildfire has removed sagebrush cover. However, the conservation plan does not identify a funding source for this action.

The Interagency Standards for Fire and Fire Aviation Operations “Red Book” includes a BMP for GRSG habitat conservation for wildlife and fuels management (BLM 2013a). This document is a supplemental policy or guidance for the BLM, the Forest Service, and the USFWS. This BMP would benefit the GRSG during interagency wildland fire operations. It would do this by using spatial habitat data and predictive services to prioritize and preposition firefighting resources in GRSG habitat areas. However, since several years have elapsed since GRSG BMPs were incorporated, benefits would likely now be apparent, and it is unclear if this is currently the case. In January 2015, Secretarial Order 3336 “Rangeland Fire Prevention, Management and Restoration” was signed by the Secretary of the Interior. The order sets forth enhanced policies and strategies for preventing and suppressing rangeland wildfire and for restoring sagebrush landscapes impacted by wildfire across the West. The order will improve coordination with local, state, tribal, and regional efforts to address rangeland wildfire at a landscape level.

Coordination with rural fire districts to manage wildfires in GRSG habitat will further reduce this threat across land ownership types and improve the quality and quantity of habitat.

Reasonably foreseeable wildland fire management efforts are projected to increase (**Section 5.3.12**), especially through increased coordination of federal, state, and local wildfire prevention actions and the implementation of other BLM and Forest Service LUPAs in MZ IV. When the impacts of the Oregon Sub-region RMPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

However, in those years where wildfires that threaten wildland-urban interface are widespread, firefighting resources would be shifted to those areas and away from GRSG habitat. Years with extensive involvement of wildland-urban interface in wildfires may not see the expected benefits of direction intended to increase wildfire response in GRSG habitat.

Spread of Invasive Plants

Nature and Type of Effects. The impacts of invasive plants on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Via seeds carried by wind, humans, machinery, and animals, invasive plants have invaded and will continue to invade many locations in MZ IV, including the sub-region. Some species, including cheatgrass and other annual bromes, have become so ubiquitous throughout the sub-region that it is considered economically unfeasible to attempt to eradicate them. Modeling has suggested that more than 18 million acres of GRSG habitat

MZ IV are considered to be at a moderate to high risk for cheatgrass occurrence (Manier et al., 2013, p.90).

The BLM currently manages invasive plant infestations through integrated invasive plant management: biological, chemical, mechanical, manual, and educational methods. It is guided by the 1991 and 2007 RODs for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991) and by the 2007 Programmatic Environmental Report (BLM 2007). The July 2010 Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS and ROD (BLM 2010) provides additional guidance within the Oregon sub-region. The BLM also participates in the National Early Warning and Rapid Response System for Invasive Species. The goal of this system is to minimize the establishment and spread of new invasive plants through a coordinated framework of public and private processes (FICMNEW 2003). Invasive plants are managed in cooperation with county governments and represents a landscape-level approach across management jurisdictions.

Impact Analysis. Increased surface disturbance, motorized travel, and animal and human activity, would increase the chance for the establishment and spread of invasive plants.

Management under Alternative A would allow for the most acres of surface disturbance; therefore, the potential for invasive plant spread and establishment would be greatest under this alternative, and effects to GRSG (e.g., reduction in quality of habitat) would be more pronounced if all of the potential surface disturbance would occur. All of the action alternatives would reduce surface disturbance relative to the No Action alternative and would include invasive plant-prevention measures to differing extents. Alternative C relies on passive management for restoration efforts, which has shown no ability to reduce or halt the spread of invasive plants or to promote recovery of native plant communities where invasive plants are dominant. Of all alternatives, Alternatives B, D, F, and the Proposed Plan would likely have the lowest potential for invasive plant spread and establishment, given the 3 percent (no more than 1 percent per decade) anthropogenic disturbance threshold which would limit surface disturbance; extensive mitigation and monitoring plans; wildfire and invasive plants assessments and subsequent prioritization; application of RDFs and BMPs; and requirement for a net conservation gain of GRSG habitat. Implementation of these alternatives would be in accordance with the COT report objective for invasive plants, which is to maintain and restore healthy native sagebrush plant communities.

Invasive plants on BLM-administered and National Forest System lands would be managed under all alternatives though management in the Proposed Plan would provide the widest range of potential management actions for treatment. This would provide a net conservation gain to GRSG by restoring degraded sagebrush habitat.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive plants on both federal and non-federal lands. Projects subject to the general stipulations outlined in the Montana executive order are required to control noxious and invasive plant species and to use native seed mixes during reclamation processes. Similarly, Utah's state plan directs land managers to aggressively respond to new infestations of invasive plants, and prioritize containment of infestations within sagebrush habitats. These stipulations would benefit GRSG core habitat areas by limiting the spread or establishment of invasive plants, particularly on lands that lack BLM and Forest Service protective regulatory mechanisms. Further, the *Greater Sage-Grouse Habitat Conservation Strategy for NRCS in Idaho* has identified GRSG conservation measures related to invasive plants, such as reducing the risk and rate of wildfire spread, restoration and rehabilitation, and invasive plant treatment. A number of projects are ongoing or in the planning phase to treat nonnative, invasive plants (See **Table 5-22**).

Reasonably foreseeable invasive plant management efforts are projected to increase (**Section 5.3.12**), including other state and county noxious weed regulations and the implementation of other BLM and Forest Service LUPAs in MZ V. When the impacts of the Oregon RMPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ V. The Proposed Plan and Alternatives B, D, and F may result in the greatest net conservation gain due to the 3 percent anthropogenic disturbance cap that should reduce potential for the spread of invasive plants during the 20-year analysis period.

Conifer Encroachment

Nature and Type of Effects. The impacts of conifer encroachment on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Approximately 55 percent of conifer encroachment risk in priority habitat (and 34 percent in general habitat) occur on BLM-administered lands within MZ IV (Manier et al. 2013, p. 93). In comparison, 25 percent of conifer encroachment risk in priority habitat (and 32 percent in general habitat) occur on private lands and 15 percent in priority habitat occurs on National Forest System lands (25 percent in general habitat). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of conifer encroachment on GRSG habitat, particularly in priority habitat, than any other single land management entity.

Impact Analysis. The COT objective is to remove conifer woodlands from areas of sagebrush that are most likely to support GRSG (post-removal) at a rate that is at least equal to the rate of encroachment (USFWS 2013a, p. 47). Management under Alternatives D, E, and the Proposed Plan would target conifers in GRSG habitat for removal, with the clearest treatment priorities under Alternative D and the Proposed Plan, which identify Restoration

Opportunity Areas as key location for restoration projects and provide subsequent criteria for conifer removal. Treatment acres under the Proposed Plan are presented in **Table 2-5**. The Proposed Plan would also incorporate GRSG habitat objectives to guide treatments. Alternatives A, B, C, and F are largely silent on conifer removal and thus would not serve to reduce this threat or be in alignment with the COT objective for conifer encroachment.

Relevant cumulative actions on federal, private, and state lands within the MZ include several large conifer removal projects (See **Table 5-22**). Further, the NRCS includes conservation measures to remove encroaching conifers near leks and seasonal habitats while minimizing disturbance to GRSG (NRCS 2012, p. 13). SGI has helped reduce the threat of early succession conifer encroachment through mechanical removal on 206,099 acres of private lands within MZ IV. The majority of these efforts were located inside PACs (NRCS 2015), helping to preserve historic fire return intervals and important GRSG habitat. Utah's state plan directs land management agencies to remove encroaching conifers and conduct restoration of sagebrush habitats to expand GRSG habitat where possible.

Reasonably foreseeable conifer encroachment management efforts are projected to increase (**Section 5.3.12**), including efforts on private land and implementation of other BLM and Forest Service LUPAs in MZ IV. When the impacts of the Oregon RMPA are added to these actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV. The Proposed Plan would have the greatest reduction in the threat from conifer encroachment and provide a net conservation gain to GRSG. Alternatives D and E would also reduce the threat, though to a lesser degree than the Proposed Plan because they do not specify acres for treatment or habitat objectives.

Infrastructure

Rights-of-Way

Nature and Type of Effects. The impacts of ROWs on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Infrastructure, including ROWs and associated facilities and urbanization, is widespread throughout MZ IV and has affected GRSG habitat in many locations. Development of roads, fences, and utility corridors has also contributed to habitat loss and fragmentation in portions of MZ IV. The best available estimates suggest about 25 percent of the MZ IV is within approximately 4 miles of urban development (Knick et al. 2011, p. 214). Impacts of infrastructure development in MZ IV are primarily related to highways, roads, power lines, and communication towers, with 90 percent of MZ IV within 4 miles of a road, 30 percent within 4 miles of a power line, and 5 percent within 4 miles of a communication tower (Knick et al. 2011, pp. 215-216).

Although not representative of all infrastructure ROWs, transmission lines greater than 115 kilovolts indirectly influence 37 percent of priority habitat and 38 percent of general habitat across MZ IV. Indirect effects are assumed to occur to a radius of 4 miles (Manier et al. 2013, p. 41). Approximately 62 percent of transmission lines in priority habitat and 43 percent in general habitat are on BLM-administered lands across GRSG habitats in MZ IV (Manier et al. 2013, p. 41). In contrast, National Forest System lands contain 5 percent of transmission lines in priority habitat and 7 percent in general habitat. Therefore, BLM actions are likely to have a greater potential to affect transmission line ROWs in GRSG habitat than any other land management entity. Designating ROW exclusion and avoidance areas in PHMA and GHMA on BLM-administered and National Forest System lands could reduce the threat on these lands. However, ROW exclusion areas on BLM-administered and National Forest System lands could result in infrastructure being routed around federal lands where land ownership patterns are mixed, thereby increasing its length and possibly its impact.

Impact Analysis. **Table 5-10** lists the areas of ROW avoidance and exclusion in GRSG habitat by alternative. **Table 5-11** lists acres of PHMA and GHMA in existing or future utility corridors.

Alternative A (current management) leaves the greatest amount of GRSG habitat open to ROW development across MZ V. Alternative A does contribute to some ROW exclusion and avoidance areas, though not as many acres as other action alternatives do. Generally, Alternative A provides the least protective measures for GRSG habitat.

Across MZ IV, Alternative B, C, D, E, F, and the Proposed Plan would reduce the number of open acres in PHMA, with fewer reductions under the Proposed Plan than the other Action Alternatives. However, the Proposed Plan contains measures, including the 3 percent disturbance cap (maximum 1 percent per decade), lek buffers, comprehensive RDFs and BMPs, and mitigation measures to avoid or reduce impacts of ROW developments in GRSG habitat. Alternatives B, C, E and F would increase ROW exclusion areas in PHMA in MZ IV with the most ROW exclusion in GRSG habitat under Alternatives C and F due to increases in exclusion in GHMA as well as PHMA. However, designation of ROW exclusion may result in infrastructure being routed onto adjacent private lands that lack similar protective measures for GRSG where land ownership is mixed.

Table 5-10
Acres of Rights-of-Way Designations in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Open to Rights-of-Way				
Alternative A	1,714,000	97%	2,992,000	45%
Alternative B	59,000	0%	1,644,000	0%
Alternative C	59,000	0%	1,644,000	0%
Alternative D	59,000	0%	1,644,000	0%
Alternative E	59,000	0%	2,574,000	36%
Alternative F	59,000	0%	1,644,000	0%
Proposed Plan	98,000	40%	1,671,000	2%
Right-of-Way Exclusion				
Alternative A	787,000	2%	494,000	4%
Alternative B	2,984,000	74%	477,000	<1%
Alternative C	2,984,000	74%	2,394,000	80%
Alternative D	787,000	2%	494,000	4%
Alternative E	2,984,000	74%	484,000	1%
Alternative F	2,984,000	74%	2,394,000	80%
Proposed Plan	787,000	2%	493,000	3%
Right-of-Way Avoidance				
Alternative A	9,434,000	6%	5,298,000	10%
Alternative B	8,894,000	<1%	6,664,000	29%
Alternative C	8,893,000	0%	4,746,000	0%
Alternative D	11,090,000	20%	5,299,000	10%
Alternative E	8,893,000	0%	5,121,000	7%
Alternative F	8,893,000	0%	4,746,000	0%
Proposed Plan	11,092,000	20%	6,642,000	29%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA within rights-of-way designations in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Table 5-11
Acres of Existing Utility Corridors in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
	Proposed Utility Corridor			
Alternative A	128,000	30%	125,000	21%
Alternative B	128,000	30%	125,000	21%
Alternative C	128,000	30%	125,000	21%
Alternative D	128,000	30%	125,000	21%
Alternative E	128,000	30%	125,000	17%
Alternative F	128,000	30%	125,000	21%
Proposed Plan	118,000	25%	123,000	20%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA within existing utility corridors in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

The No Action alternative, Alternative D, and the Proposed Plan contribute the same amount of ROW exclusion in GRSG habitat across MZ IV; however, measures in the proposed plan would serve to steer new disturbance away from PHMA and provide flexibility in siting new ROWs to avoid GRSG habitat, compensating for the lesser amount of exclusion acres compared to the other action alternatives. Alternative D and the Proposed Plan would manage PHMA as ROW avoidance; these management actions would not prohibit ROW development on BLM-administered lands and thus would not result in development being shifted onto private or other nearby lands where land ownership is mixed. Alternative A would not adequately protect GRSG in the sub-region.

Acres of existing utility corridors would be largely similar across all alternatives in both PHMA and GHMA; in conjunction with other past, present, and reasonably foreseeable future projects there would be no difference in cumulative impacts under any of the alternatives except that the Proposed Plan would require design features intended to minimize impacts on GRSG.

The number of ROW authorizations are anticipated to grow in the MZ over the 10-year analysis period. Increasing populations, continued energy development, and new communication sites drive the need for new ROWs on both federal and non-federal lands. Projects that cross BLM-administered land would be subject to the conservation measures described above and their impacts would be minimized. However, the Boardman to Hemingway and Gateway West projects would be excepted from the conservation measures in this plan; conservation measures for GRSG will be incorporated via the site-specific

NEPA process for these projects. Additionally, this project will be in compliance with BLM Instruction Memorandum 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures, which will require that GRSG habitat is maintained or enhanced through avoidance, minimization, and/or mitigation. Actual impacts and contribution to cumulative effects from these projects are unknown at this time.

New ROW authorizations in MZ IV that require state agency review or approval would be subject to the permitting process and stipulations for development in GRSG Core areas under the Montana executive order. These stipulations would benefit the GRSG in Core areas by encouraging ROW development outside of core habitat areas, restricting surface occupancy within 0.6 mile of occupied leks, prohibiting power lines greater than 115 kV outside of designated corridors, and locating new roads used to transport products or waste over 1.9 miles from occupied leks. Similarly, ROW authorizations in Nevada would be subject to measures in the Nevada state plan, including avoidance, minimization, and mitigation of any unavoidable impacts to GRSG habitat. The Utah Executive Order directs state agencies to minimize disturbance within GRSG Management Areas and maintain consistency with conservation measures in the Utah state plan. New ROW authorizations that would occur in the majority of the MZ within Idaho or Oregon that lack state plans containing regulatory mechanisms may incorporate GRSG habitat recommendations from these states' plans, though these would be voluntary measures and not binding conditions. While the current Oregon plan is comprised of voluntary management guidelines, the guidelines may be utilized by state regulatory agencies including the Energy Facility Siting Council as conditions of approval on a case-by-case basis for certain energy projects. For example, the council has jurisdiction on wind energy projects greater than 105 MW (Dave Budeau, phone conversation with author, March 26, 2015). In addition, the Oregon Sage-Grouse Action Plan currently under development will provide regulatory mechanisms for GRSG conservation on private and state lands.

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Utah executive orders and Nevada state plan) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood rearing habitat, or other important areas that do not follow geopolitical boundaries.

Reasonably foreseeable ROW development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private GRSG conservation efforts as well as other BLM and Forest Service proposed

plans in MZ IV would reduce the threat by restricting the type and location of developments. When restrictions in the Oregon RMPA are added to these conservation actions, the impacts of future ROW developments would be further reduced. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ V by providing the greatest amount of ROW exclusion in GRSG habitat. The Proposed Plan and Alternative D would provide the greatest net conservation gain to GRSG habitats and populations would also reduce the threat to a lesser degree by providing the flexibility to site ROWs with the least impact on GRSG habitat.

Renewable Energy

Nature and Type of Effects. The impacts of renewable energy on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Wind energy development is an increasing threat to some populations in MZ IV. Over the last six years, the BLM has authorized and then relinquished one ROW for wind development and has two pending applications. Wind testing sites have been authorized on BLM lands in the Idaho and Southwestern Montana sub-region, though no wind developments have been authorized and constructed.

Solar energy development potential in MZ IV is generally lower than the solar energy development potential in the southern portion of GRSG range (Manier et al. 2013 p. 69; NREL 2015), and the BLM has not received any applications for utility-scale solar production in the sub-region, nor are there solar resources comparable to the areas where utility-scale solar production projects are being proposed or built.

Although not representative of all renewable energy development, wind turbines indirectly influence less than 1 percent of priority habitat and general habitat combined across MZ IV (Manier et al. 2013, p. 61). The distance for indirect influence on GRSG from wind energy developments is 4.3 miles; this distance is derived from the foraging distance of GRSG predators (Manier et al. 2013, p. 61). Private lands account for 82 percent of wind turbines affecting GRSG in priority habitat (and 62 percent in general habitat) within MZ IV. Therefore, conservation actions on private land are likely to have a greater potential to ameliorate the effects of wind energy development on GRSG habitat than any other single land management entity.

Impact Analysis. **Table 5-12** lists acres of wind energy ROW allocations by alternative.

Alternative A (current management) contributes to the greatest amount of GRSG habitat open to wind ROW development across MZ IV. Alternative A does contribute to some wind ROW exclusion and avoidance areas, though not as many acres as other action alternatives do. Generally, Alternative A provides the least protective measures for GRSG habitat.

Table 5-12
Acres of Wind Energy Management Designations in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Open to Wind Rights-of-Way				
Alternative A	1,655,000	100%	2,847,000	47%
Alternative B	0	0%	1,500,000	0%
Alternative C	0	0%	1,500,000	0%
Alternative D	0	0%	2,847,000	47%
Alternative E	0	0%	2,429,000	38%
Alternative F	0	0%	1,500,000	0%
Proposed Plan	0	0%	1,500,000	0%
Wind Right-of-Way Exclusion				
Alternative A	9,740,000	<1%	1,263,000	1%
Alternative B	11,936,000	19%	1,245,000	<1%
Alternative C	11,936,000	19%	3,163,000	61%
Alternative D	9,740,000	<1%	1,263,000	1%
Alternative E	11,936,000	19%	1,252,000	1%
Alternative F	11,936,000	19%	3,163,000	61%
Proposed Plan	10,587,000	8%	1,261,000	1%
Wind Right-of-Way Avoidance				
Alternative A	541,000	100%	4,674,000	12%
Alternative B	1,000	100%	6,040,000	32%
Alternative C	0	0%	4,122,000	0%
Alternative D	2,197,000	100%	4,675,000	12%
Alternative E	0	0%	4,497,000	8%
Alternative F	0	0%	4,122,000	0%
Proposed Plan	1,390,000	100%	6,046,000	32%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA within wind energy management designations in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Alternatives B, C, E, and F would manage the most acres of PHMA as ROW exclusion, while Alternatives C and F also contribute substantially to ROW exclusion acres in GHMA, and would likely be the most protective of GRSG habitat of all action alternatives. Alternatives D and the Proposed Plan manage the greatest acreage of PHMA as ROW avoidance. The Proposed Plan would

offer additional protections for PHMA, including anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, BMPs and RDFs and mitigation requirements. The impacts of these allocations would be similar to those described for ROWs in the previous section. Across MZ IV, most other BLM/Forest Service proposed plans maintain exclusion areas in PHMA for wind energy.

Projects that require state agency review or approval would be subject to the Montana executive order permitting process. This would encourage wind energy development outside of core habitat areas. Similarly, in Nevada, wind energy developments would be located outside of core habitat, or would minimize and/or mitigate for impacts if avoidance is not feasible. The Utah Executive Order directs state agencies to minimize disturbance within GRSG Management Areas and maintain consistency with conservation measures in the Utah state plan. In Oregon and Idaho, wind energy projects could voluntarily site development outside of GRSG habitat, but currently no regulatory mechanisms are in place to reduce impacts to GRSG habitat from projects requiring state agency review or approval. However, the Oregon Sage-Grouse Action Plan currently under development will provide regulatory mechanisms for GRSG conservation on private and state lands.

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Utah executive orders and Nevada state plan) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where complementary protections can benefit leks, early brood rearing habitat, or other important areas that do not follow geopolitical boundaries.

Reasonably foreseeable energy development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private GRSG conservation efforts as well as wind energy restrictions in other BLM and Forest Service proposed plans in MZ IV would reduce the threat by restricting the type and location of developments. When restrictions in the Oregon RMPA are added to these conservation actions, the impacts of future energy developments would be further reduced. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ IV by providing the greatest amount of wind exclusion in GRSG habitat. The Proposed Plan would also reduce the threat to a lesser degree by providing the flexibility to site energy developments with the least impact on GRSG habitat.

Livestock Grazing and Free-Roaming Equids

Nature and Type of Effects. The impacts of grazing and free-roaming equids on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Livestock grazing is prevalent across MZ IV. Rangeland health assessments have found that over 19 percent of BLM-administered grazing allotments in GRSG habitat in MZs IV are not meeting wildlife standards with grazing as a causal factor (Manier et al. 2013, p. 97). Additionally, nearly 2 million acres of GRSG habitat within MZ IV is federally managed wild horse and burro range (Manier et al. 2013, p. 102).

Perhaps the most pervasive change associated with grazing management in GRSG habitats throughout MZ IV is in part the construction of livestock fencing (Knick et al. 2011, p. 224). Barbed wire fences contribute to direct mortality through fence collisions (Stevens et al. 2011), and recent research in Idaho by Stevens (2011) found that fence collision frequency for GRSG is 0.64 collisions per fence mile. The Nature Conservancy of Oregon and the BLM Burns District (BLM 2013b) conducted a study of livestock fence GRSG collision risk in the District to identify potential fences for marking, relocation, or removal. Results of the study indicate that there are 52 miles of high-risk fence in the District.

Wild horses also occur within MZ IV and the sub-region; within MZ IV, 5.7 percent of priority habitat is negatively influenced by free-roaming equids (Manier et al. 2013, p. 102). Within MZ IV, seven designated HMAs occur on BLM-administered lands in the Oregon sub-region (**Section 3.6**). The BLM establishes AML for each HMA, which represents the population objective. In Oregon, most of the HMAs are above AML, ranging from approximately 10 to 400 percent above AML.

Impact Analysis. **Table 5-13** lists the acres of PHMA and GHMA available and unavailable for grazing within MZ IV, by alternative.

Throughout MZ IV, acres available to livestock grazing in PHMA and GHMA are similar across most alternatives. Acres unavailable to livestock grazing would be greatest under Alternative C, which closes all GRSG habitat to grazing, followed by Alternative F which would reduce grazing by 25 percent in PHMA, followed by the Proposed Plan which closes approximately 22,000 acres in key RNAs. Reductions and closures would benefit GRSG by maintaining nesting cover for protection and forage.

As discussed above, light to moderate grazing is considered compatible with GRSG habitat; thus, closing acres to grazing may not in and of itself benefit or harm GRSG. Possibly equally or more beneficial is restricting range improvements in GRSG habitat, limiting fencing, and effectively implementing range health standards on grazing allotments in GRSG habitat. Alternatives B

Table 5-13
Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Available to Livestock Grazing				
Alternative A	11,693,000	19%	8,659,000	22%
Alternative B	11,693,000	19%	8,659,000	22%
Alternative C	9,475,000	0%	6,749,000	0%
Alternative D	11,668,000	19%	8,653,000	22%
Alternative E	11,693,000	19%	8,066,000	16%
Alternative F	9,475,000	0%	6,749,000	0%
Proposed Plan	11,68,7000	19%	8,679,000	22%
Unavailable to Livestock Grazing				
Alternative A	250,000	7%	118,000	21%
Alternative B	250,000	7%	118,000	21%
Alternative C	2,467,000	91%	2,028,000	95%
Alternative D	275,000	16%	124,000	26%
Alternative E	250,000	7%	103,000	10%
Alternative F	232,000	0%	93,000	0%
Proposed Plan	262,000	11%	124,000	26%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

through F and the Proposed Plan include grazing restrictions (to varying degrees) which would help protect GRSG from potential impacts such as habitat changes due to herbivory and collisions with fencing. In terms of impacts on BLM-administered and National Forest System lands, Alternative A would have the fewest GRSG-specific protective grazing restrictions, and would therefore have the greatest impacts on the species. Alternative C would have no areas available for livestock within with designated habitat, and would therefore have the fewest direct impacts on the species. Fewer miles of internal fencing may be needed on public land under this Alternative, however, as a result of restricting grazing in GRSG habitat under Alternative C, increased fencing on private lands may occur. Reduced grazing under Alternative F would have similar, but fewer impacts, compared to Alternative C.

The COT report objectives for livestock grazing are to manage grazing in a manner consistent with local ecological conditions. This management would

maintain or restore healthy sagebrush shrub and native perennial grass and forb communities and conserve essential habitat components for GRSG. Restoration to meet these standards and adequate monitoring would be required. The COT report also states that land managers should avoid or reduce the impact of range management structures on GRSG habitat.

If BLM-administered lands were made unavailable for livestock grazing, as under Alternative C, this could increase grazing pressure on adjacent private lands. Loss of federal grazing permits would pose a threat of indirect adverse effects, including potential conversion of private grazing lands to agriculture, if the loss of federal grazing permits/leases made ranching less economically viable.

Since 2010, SGI has enhanced rangeland health through rotational grazing systems, re-vegetating former rangeland with sagebrush and perennial grasses and control of invasive plants. On privately-owned lands, SGI has developed a prescribed grazing approach that balances forage availability with livestock demand. This system allows for adjustments to timing, frequency, and duration of grazing, ensuring rangelands are managed sustainably to provide continued ecological function of sagebrush-steppe. A primary focus of the prescribed grazing approach is maintenance of key plant species, such as deep-rooted perennial grasses that have been shown to be essential for ecological resistance to invasive annual grasses (Reisner et al. 2013, pp. 1047-1048). These actions help to alleviate the adverse impacts associated with improper grazing practices outlined above under Nature and Type of Effects. Within MZ IV, SGI has implemented 314,930 acres of prescribed grazing systems. This program is likely the largest and most impactful program on private lands within MZ IV. Because of its focus on priority areas for conservation, which often overlap PHMA, the SGI's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on GRSG when considered alongside protective BLM management actions in PHMA.

Reasonably foreseeable livestock grazing management efforts in MZ IV are expected to increase over the analysis period (**Section 5.3.12**), through increased NRCS conservation actions under the Sage-Grouse Initiative (e.g., fence marking and conservation easements), state efforts to maintain ranchland, and the implementation of other BLM and Forest Service LUPAs in MZ IV. When grazing management within the Oregon RMPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Under all alternatives the BLM has the ability to adjust appropriate management levels of wild horses if resource damage occurs; however, only Alternatives B through F and the Proposed Plan provide management guidelines specific to GRSG habitat (e.g., prioritizing gathers in GRSG habitat), which would benefit the species more than Alternative A. Reasonably foreseeable wild horse management efforts are projected to increase over the analysis period (**Section**

5.3.12) with implementation of other BLM and Forest Service LUPAs in MZ IV. Other past, present, and reasonably foreseeable future actions are unlikely to affect the threat from wild horses and burros, as these animals are federally-managed. When wild horse management within the Oregon RMPA is added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV. Impacts may be reduced to the greatest extent under the Proposed Plan, where AMLs would be evaluated with consideration of GRSG habitat objectives for BLM-administered lands.

Conversion to Agriculture

Nature and Type of Effects. The impacts of agricultural conversion on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Regional assessments estimate that while only 1 percent of priority habitat and general habitat in MZ IV are directly influenced by agricultural development, over 85 percent of GRSG habitat is within approximately 4 miles of agricultural land and indirectly influenced by it (Manier et al. 2013, p. 27).

Impact Analysis. The BLM and Forest Service do not convert public lands to tilled agriculture. As such, the only direct authority these agencies have over conversion to agriculture is by retaining or disposing of lands in the realty program. Lands retained under BLM and Forest Service management will not be converted to tilled agriculture and disposing of lands could increase the likelihood they will be converted to tilled agriculture, depending on their location and new management authority.

As shown below in **Table 5-14**, acres identified for retention are similar in the sub-region and in MZ IV among the alternatives. Under all action Alternatives, including the Proposed Plan, the BLM and Forest Service would generally retain GRSG habitat, thereby eliminating the possibility that GRSG habitat would be converted to tilled agriculture use. Current land tenure retention guidance includes retaining lands supporting threatened and endangered species and species of high interest, which would mean that GRSG habitat would be retained under the No Action alternative. Further, all action alternatives and the Proposed Plan would provide guidance to specifically consider GRSG habitat values when land is considered for sale or exchange. Most acres within MZ IV that are identified for disposal under Alternatives B, C, D, F, and the Proposed Plan are within the Idaho and southwestern Montana sub-region, thus management in the Oregon sub-region would have relatively little influence on this threat in MZ IV. However, land tenure adjustments require site-specific NEPA analysis and land sales must meet the disposal criteria under applicable law. BLM land tenure adjustments are not anticipated to be a significant contributing element to the threat of agriculture conversion.

Table 5-14
Acres Identified for Retention and Disposal in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
	Acres Identified for Retention			
Alternative A	11,886,000	18%	8,543,000	22%
Alternative B	11,972,000	19%	8,543,000	22%
Alternative C	11,972,000	19%	8,633,000	23%
Alternative D	11,972,000	19%	8,543,000	22%
Alternative E	11,886,000	18%	7,996,000	16%
Alternative F	11,972,000	19%	8,543,000	22%
Proposed Plan	11,973,000	19%	8,627,000	22%
	Acres Identified for Disposal			
Alternative A	42,000	90%	210,000	15%
Alternative B	4,000	0%	210,000	15%
Alternative C	4,000	0%	178,000	0%
Alternative D	4,000	0%	210,000	15%
Alternative E	42,000	90%	195,000	9%
Alternative F	4,000	0%	210,000	15%
Proposed Plan	4,000	0%	178,000	0%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Cumulative impacts vary relatively little across alternatives because BLM and Forest Service management may have little impact on alleviating this threat. Restrictions on grazing on federal land could increase agriculture pressure on adjacent private lands. If the loss of federal grazing permits or leases makes ranching economically unviable, the potential conversion of private grazing lands to agriculture could increase. However, the Proposed Plan does not substantially increase acreage unavailable to grazing.

The COT report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and to prioritize restoration. In areas where taking agricultural lands out of production has benefited GRSG, the programs supporting these actions should be targeted and continued (USFWS 2013a, p. 48).

In accordance with the COT objective, the NRCS's SGI program focuses on maintaining ranchland that provides habitat for GRSG. This voluntary program

provides private landowners with monetary incentives to protect GRSG habitat, often through conservation easements. As a result, private land containing GRSG habitat is protected from conversion to agriculture or other development for the life of the conservation agreement. The conservation easements and other conservation incentives, such as restoration of water features and fence marking, can enhance the ability of private ranchlands to support GRSG. As of 2014, SGI has secured conservation easements on 98,167 acres within MZ IV and marked or removed 95 miles of fence (NRCS 2015). This has preserved habitat and reduced the risk of direct mortality on these lands.

Over the analysis period, conversion to agriculture is expected to increase (**Section 5.3.12**), though state and private conservation efforts as well as other BLM and Forest Service proposed plans in MZ IV would reduce the threat. When land tenure decisions within the Oregon RMPA are added to these conservation actions, this would result in net conservation gain to GRSG habitats and populations in MZ IV.

Energy Development and Mining

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing GRSG population trends. For mining, the COT report objective is to maintain stable to increasing GRSG populations and no net loss of GRSG habitats in areas affected by mining (USFWS 2013a, p. 49).

There are approximately 1,137,700 acres of GRSG habitat in MZ IV where energy and mineral development (including geothermal, mineral materials, wind energy, and nonenergy leasable minerals) is presently occurring. There are 6,553,300 acres indirectly influenced by energy development (including oil and gas, mineral materials, and wind energy; indirect effects were not quantified for geothermal and nonenergy leasable mineral developments) (Manier et al. 2013, pp. 52-71). No coal or oil and gas development is presently occurring in MZ IV.

Oil and Gas

Nature and Type of Effects. The impacts of oil and gas development on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Currently, oil and gas development within MZ IV is limited to the extent that the area of direct impact to priority habitat and general habitat is smaller than the minimum reporting size of Manier et al. (2013, p. 52). However, because indirect influence was estimated to extend nearly 12 miles from oil and gas development, approximately 222,100 acres of priority habitat and 32,700 acres of general habitat are influenced by oil and gas development in MZ IV (Manier et al. 2013, p. 52). The area of indirect influence is split evenly between BLM-administered and private lands. Additionally, approximately 346,000 acres (1 percent) of GRSG habitat in MZ IV

are leased but currently undeveloped (Manier et al. 2013, p. 55), representing additional potential impacts to GRSG and its habitat.

Although oil and gas activities on private lands would not be subject to BLM or Forest Service regulatory oversight, regulatory mechanisms on both federal surface and split-estate lands in MZ IV would be influential should development occur. Development on BLM-administered split-estate lands would require mitigation for impacts on GRSG habitat on private surface lands that would not be required on lands with both privately held surface and mineral estate.

No RFD scenario for oil and gas development in the Oregon Sub-region was developed for the RMPA/EIS. All future looking estimates are based on broad-scale “trends” review, as described in **Chapter 5**. The potential for impacts would be reduced where areas are closed to fluid mineral leasing and where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs and BMPs (**Appendix C**, Required Design Features and Best Management Practices), the contribution to impacts on GRSG habitat on BLM-administered and National Forest System lands in MZ IV from Oregon sub-region management is anticipated to be small and localized under all alternatives.

Impact Analysis. **Table 5-15** and **Table 5-16** provide a quantitative summary of fluid mineral leasing conditions on BLM-administered and National Forest System lands across MZ IV, followed by an analysis of the Oregon sub-regional alternatives.

As shown in **Table 5-15** and **Table 5-16**, fluid mineral closures and stipulations within the Oregon sub-region exert a fairly large influence within the broader MZ. Alternatives C and F would provide the greatest protection to GRSG habitat in the MZ by closing PHMA and GHMA to new leases. As such, reasonably foreseeable future leasing projects would be less likely to impact GRSG populations on federal lands. Alternatives B and D would close PHMA to new leases, and Alternative E would prohibit development in Core Areas. This would reduce well density and impacts associated with construction and operation. Alternatives D and the Proposed Plan would establish NSO and CSU/TL stipulations, and the Proposed Plan would provide additional protections to GRSG from fluid mineral development by requiring anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, mitigation requirements, RDFs and BMPs, and by managing SFA as NSO with no waivers, exceptions, and modifications. While Alternatives C or F would provide the greatest amount of protection for GRSG and its habitat by closing PHMA and GHMA to fluid mineral leasing, the Proposed Plan would substantially reduce potential impacts relative to the No Action Alternative.

Table 5-15
Acres Open and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Open² to Fluid Mineral Leasing				
Alternative A	1,215,000	100%	858,000	100%
Alternative B	0	0%	858,000	100%
Alternative C	0	0%	0	0%
Alternative D	0	0%	0	0%
Alternative E	0	0%	593,000	100%
Alternative F	0	0%	4,000	100%
Proposed Plan	0	0%	0	0%
Closed to Fluid Mineral Leasing				
Alternative A	1,512,000	32%	1,311,000	36%
Alternative B	3,278,000	69%	1,312,000	36%
Alternative C	3,278,000	69%	2,787,000	70%
Alternative D	1,512,000	32%	1,311,000	36%
Alternative E	3,278,000	69%	1,158,000	27%
Alternative F	3,278,000	69%	2,754,000	69%
Proposed Plan	1,507,000	32%	1,308,000	36%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana Sub-region.² Open with standard lease terms and conditions. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Table 5-16
Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
NSO Stipulations				
Alternative A	9,333,000	<1%	3,825,000	1%
Alternative B	9,321,000	0%	3,825,000	1%
Alternative C	9,321,000	0%	3,784,000	0%
Alternative D	10,769,000	13%	3,943,000	4%
Alternative E	9,321,000	0%	3,812,000	1%
Alternative F	9,321,000	0%	3,784,000	0%
Proposed Plan	11,354,000	18%	3,828,000	1%
CSU/TL Stipulations				
Alternative A	538,000	100%	3,838,000	15%
Alternative B	0	0%	3,838,000	15%
Alternative C	0	0%	3,261,000	0%
Alternative D	317,000	100%	4,578,000	29%
Alternative E	0	0%	3,657,000	11%
Alternative F	0	0%	3,291,000	1%
Proposed Plan	0	0%	5,037,000	35%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana Sub-region.

This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

All BLM and Forest Service Proposed Plans within MZ IV include BMPs and RDFs to minimize impacts on GRSG from oil and gas development on federal lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas which are already leased, BMPs can be applied as conditions of approval for development of existing leases. Similarly, state plans contain similar measures to reduce impacts. Together, these measures would help protect unfragmented habitats, minimize habitat loss and fragmentation, and maintain conditions that meet GRSG life history needs. Recent research indicates that restored habitats lack many of the features sought by GRSG in their habitat areas, and may not support GRSG for long periods following restoration activities. In order to conserve GRSG populations on the landscape, protection of existing habitat through minimizing development, would provide the best hope for GRSG persistence (Arkle et al. 2014).

Reasonably foreseeable oil and gas development is limited in the MZ. When the impacts of the Oregon RMPA are added to these actions, the impact would be a net conservation gain due in large part to implementation of NSO stipulations, anthropogenic disturbance caps, and adaptive management that would minimize future disturbances to GRSG populations and habitats.

Under the Montana Executive Order, authorizations of oil and gas development that require state agency review or approval would be subject to the GRSG permitting process. They also would be subject to stipulations for development in GRSG Core areas. Similarly, authorizations in Nevada would be subject to measures in the Nevada state plan, including avoidance, minimization, and mitigation of any unavoidable impacts to GRSG habitat. Oil and gas lease authorizations in Utah that require state agency review or approval would be subject to the Utah executive order, which directs the Utah division of Oil, Gas, and Mining to consult with UDWR on all actions within GRSG Management Areas, and incorporate conservation measures from the state's GRSG conservation plan. These measures would be of particular benefit on privately owned (non-split-estate) surface, where BLM and Forest Service protective regulatory mechanisms would not apply.

The effect of the Oregon RMPA alternatives and other past, present, and reasonably foreseeable future conservation actions in the MZ (most notably the Montana and Utah executive orders and the Nevada state plan) could be synergistic, meaning that the effects of the actions together is greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation benefit, especially in areas where little development has occurred to date.

Reasonably foreseeable oil and gas development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private GRSG conservation efforts as well as other BLM and Forest Service proposed plans in MZ IV would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Oregon RMPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV. Alternatives C and F would provide the greatest net conservation gain to GRSG habitats and populations in MZ IV by providing the greatest amount of GRSG habitat closed to leasing. The Proposed Plan would also reduce the threat to a lesser degree through additional conservation measures.

Geothermal

Nature and Type of Effects. The impacts of geothermal development on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and MZ IV. Geothermal energy development potential is particularly high throughout MZ IV and geothermal leases directly affect 75,900 acres (less than 1 percent) of GRSG habitats in the MZ (Manier et al. 2013, p. 71). Geothermal leases in the sub-region cover 60,000 acres (**Section 3.12**).

The geothermal RFD scenario for the Oregon sub-region is described in **Section 5.3.6**. The potential for impacts would be reduced where areas are closed to fluid mineral leasing and where NSO and CSU/TL stipulations are applied. Given the small acreage and implementation of RDFs and BMPs (**Appendix C**, Required Design Features and Best Management Practices), the likelihood for impacts on GRSG habitat is anticipated to be small and localized under all alternatives.

Impact Analysis. The quantitative analysis of effects from geothermal leasing would be the same as described for oil and gas because allocations and past, present, and reasonably foreseeable future actions would be the same.

Coal

Coal potential is low throughout MZ IV (Manier et al. 2013, p. 133) and there are no direct or indirect effects from surface coal leases in the MZ (Manier et al. 2013, p. 74). There is no coal development in the sub-region; thus this threat will not be described further in this document.

Mineral Materials

Nature and Type of Effects. The impacts of mineral materials on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. There are 652,000 acres of mining and mineral materials disposal sites (not including minerals mined as energy sources) on BLM-administered surface land on priority habitat and general habitat in MZ IV (Manier et al. 2013, p. 77). There are 1,049,600 acres across all landownership types, making BLM-administered land the largest contributor to direct effects from this threat. National Forest System lands contribute to direct effects on 170,200 acres of priority habitat and general habitat. Indirect effects are estimated to 1.5 miles out from the direct effects area. (Manier et al. 2013, p. 77). The mineral materials currently being developed for commercial purposes in the MZ IV include stone, sand and gravel, limestone, soil, and pumice.

Across MZ IV, priority habitat and general habitat are most affected by mining and mineral materials disposal sites on BLM-administered lands (Manier et al. 2013, p. 77). GRSG may be directly impacted, being in the path of development; however, indirect impacts on habitat affect a much wider population of birds. In total, 61 percent of priority habitat and 48 percent of general habitat influenced by the indirect impact of mining and mineral materials disposal sites are on BLM-administered land. This does not include minerals mined as energy sources.

Mining and mineral materials disposal sites on private land, by comparison, indirectly affect 26 percent of priority habitat and 34 percent of general habitat. National Forest System lands indirectly affect 10 percent of priority habitat and 13 percent of general habitat (Manier et al. 2013, p. 77). As a result, management of mining and material disposal sites on BLM-administered land would have the greatest impact on GRSG habitat conditions.

Impact Analysis. **Table 5-17** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open and closed to mineral material disposal across MZ IV.

Table 5-17
Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas ¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Open to Mineral Material Disposal				
Alternative A	2,135,000	100%	8,641,000	21%
Alternative B	6,000	17%	8,641,000	21%
Alternative C	5,000	0%	6,815,000	0%
Alternative D	6,000	17%	8,641,000	21%
Alternative E	6,000	17%	8,096,000	16%
Alternative F	6,000	17%	8,641,000	21%
Proposed Plan	5,000	0%	8,609,000	21%
Closed to Mineral Material Disposal				
Alternative A	10,458,000	1%	1,156,000	10%
Alternative B	12,588,000	18%	1,157,000	10%
Alternative C	12,588,000	18%	2,982,000	65%
Alternative D	12,588,000	18%	1,157,000	10%
Alternative E	12,588,000	18%	1,089,000	5%
Alternative F	12,588,000	18%	1,157,000	10%
Proposed Plan	12,850,000	20%	1,529,000	32%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana Sub-region.

This table displays the acres of PHMA and GHMA open and closed to mineral material disposal in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

Acres open and closed to mineral material disposal do not vary substantially across alternatives within the sub-region. However, acres of PHMA open to mineral material disposal under all the action alternatives are much lower than under the No Action alternative, while acres of GHMA open remain similar under all alternatives. All action alternatives increase acres closed to mineral

material disposal in PHMA, and keep acres closed in GHMA relatively similar. As shown in **Table 5-16**, all alternatives for mineral materials management in the Oregon RMPA would affect 20 percent or less of GRSG habitat within MZ IV.

All action alternatives reduce the acres available for mineral materials leasing in PHMA in the Oregon sub-region, which would have a beneficial impact on GRSG. Under Alternative C, all occupied GRSG habitat would be closed to mineral materials sales, which would be most protective of GRSG and its habitat. Under alternatives D and the Proposed Plan, PHMA would be closed to new mineral material sales, and expansion of existing sites would be subject to RDFs, BMPs, the disturbance cap, and mitigation. GHMA would remain open subject to RDFs and BMPs. These closures and restrictions would reduce the effect on GRSG from mineral material development on BLM-administered lands in MZ IV for most action alternatives, particularly Alternative C. However, implementing restrictive management under this alternative may shift development onto non-federal lands where such restrictions would not apply, with potentially greater impact on GRSG.

Under the Montana Executive Order, authorizations of new mineral material disposal sites that require state agency review or approval would be subject to the GRSG permitting process. They also would be subject to stipulations for development in GRSG Core areas. Similarly, authorizations in Nevada would be subject to measures in the Nevada state plan, including avoidance, minimization, and mitigation of any unavoidable impacts to GRSG habitat, and authorization in GRSG Management Areas in Utah would subject to consultation with UDWR and conservation measures. New authorizations that would occur in the majority of MZ IV within Idaho or Oregon that lack state plans containing regulatory mechanisms, may incorporate GRSG habitat recommendations from these states' plans though these would voluntary measures and not binding conditions. These measures would be of particular benefit on privately owned (non-split-estate) surface, where BLM and Forest Service protective regulatory mechanisms would not apply.

Reasonably foreseeable mineral materials development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private GRSG conservation efforts as well as other BLM and Forest Service proposed plans in MZ IV would reduce the threat by restricting the location of developments and requiring mitigation. When restrictions within the Oregon RMPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Locatable Minerals

Nature and Type of Effects. The impacts of locatable minerals management on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

As with fluid mineral development, reclamation practices may help to reduce long-term impacts on GRSG and their habitat. Although disturbed areas have

not been restored to near pre-disturbance conditions in the past, more recent efforts since 1980 have been directed toward restoring functional habitat. Future reclamation would be focused on restoring habitats capable of supporting viable GRSG populations. Even with effective restoration, however, restored areas may not support GRSG populations at the same level as prior to disturbance.

Conditions in the Sub-region and in MZ IV. Manier et al. (2013) did not separate the analysis of existing conditions in the MZ for locatable minerals and mineral materials; therefore, the existing conditions for locatable minerals is included in the discussion for *Mineral Materials*, above. In BLM-administered areas managed as open to locatable mineral exploration and development, minerals of commercial interest include diatomaceous earth, limestone, perlite, sunstone, bentonite, and gold (**Section 3.12**). Other locatable minerals are known to exist in the sub-region, but they are currently uneconomical to produce.

Impact Analysis. **Table 5-18** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open to and recommended for withdrawal from mineral entry across MZ IV. The potential for locatable mineral management in the Oregon sub-region to affect GRSG habitat within MZ IV, which only includes eastern Oregon, is low.

Acres allocated as open to mineral entry do not vary substantially across alternatives, as the acres in **Table 5-18** represent the Proposed Plans from other BLM and Forest Service sub-regions and Sub-regions in MZ IV combined with the management in the MZ IV portion of the Oregon sub-region. Acres recommended for withdrawal in PHMA would be highest under Alternatives B, C, E, F and the Proposed Plan, while acres of GHMA recommended for withdrawal would be substantially higher under Alternative C than any other action alternative.

Under Alternatives B, E, and F, PHMA would be recommended for withdrawal from mineral entry. Under Alternative C, all occupied habitat would be recommended for withdrawal, which would provide the greatest protection for GRSG and its habitat. Under Alternatives D and the Proposed Plan, the BLM would apply 43 CFR 3809 and 43 CFR 3715 standards and RDFs (to the extent consistent with applicable law) to prevent unnecessary or undue degradation of GRSG habitat. The same standards would also apply under Alternatives B, C, E, and F. Additionally, under the Proposed Plan, SFA would be recommended for withdrawal from General Mining Law of 1872, as amended.

Under all action alternatives, RDFs (to the extent consistent with applicable law) outlined in **Appendix C**, Required Design Features and Best Management Practices, would help minimize the impacts on GRSG from locatable mineral development on federal land.

Table 5-18
Acres Open and Recommended for Withdrawal from Mineral Entry in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas ¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Open to Mineral Entry				
Alternative A	6,513,000	34%	9,626,000	19%
Alternative B	4,328,000	<1%	9,626,000	19%
Alternative C	4,327,000	0%	7,789,000	0%
Alternative D	6,513,000	34%	9,626,000	19%
Alternative E	4,328,000	<1%	9,079,000	14%
Alternative F	4,328,000	<1%	9,626,000	19%
Proposed Plan	6,108,000	29%	9,960,000	22%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	5,312,000	0%	9,000	0%
Alternative B	7,499,000	29%	10,000	10%
Alternative C	7,499,000	29%	1,846,000	>99%
Alternative D	5,312,000	0%	9,000	0%
Alternative E	7,499,000	29%	10,000	10%
Alternative F	7,499,000	29%	10,000	10%
Proposed Plan	5,974,000	11%	9,000	0%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA open to mineral entry and recommended for withdrawal from locatable mineral entry in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

All Oregon sub-region action alternatives would reduce the effect on GRSG from locatable mineral development on BLM-administered lands in MZ IV, though potential reductions would be greatest under Alternative C, and to a lesser extent the Proposed Plan. However, these actions may shift development onto non-federal lands where such stipulations would not apply, with potentially greater impact on GRSG in these areas.

Authorizations of new locatable mineral sites that require state agency review or approval would be subject to either the regulatory mechanisms of the Montana, Nevada, or Utah state plans, or the voluntary measures within the Oregon state plans as described above under *Mineral Materials*. These measures would be of particular benefit on privately owned (non-split-estate) surface, where BLM and Forest Service protective regulatory mechanisms would not apply.

Reasonably foreseeable locatable mineral development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.3.12**), though state and private GRSG conservation efforts as well as other BLM and Forest Service proposed plans in MZ IV would reduce the threat by applying RDFs as Conditions of Approval. The disturbance caps in the Proposed Plans would not be applied to prevent locatable mineral entry projects, but any locatable mineral entry would be considered as disturbance under the cap. When restrictions within the Oregon RMPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Nonenergy Leasable Minerals

Nature and Type of Effects. The impacts of nonenergy leasable minerals management on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Existing leases for nonenergy leasable minerals represent a relatively small threat spatially, as 12,000 acres (less than 1 percent) of GRSG habitats in MZ IV are directly affected by existing prospecting permits (Manier et al. 2013, p. 71).

Impact Analysis. **Table 5-19** provides a quantitative summary of acreages of BLM-administered and National Forest System lands open and closed to nonenergy leasable mineral leasing across MZ IV. The potential for nonenergy leasable mineral management in the Oregon sub-region to affect GRSG habitat within MZ IV, which only includes eastern Oregon, is low.

Alternatives A and D would leave the most acres of PHMA open to nonenergy leasing, and would close the least amount of PHMA to nonenergy leasing. Under Alternative D new leasing in PHMA would be subject to NSO stipulation, and existing leases would be subject to RDFs and BMPs (**Appendix C**, Required Design Features and Best Management Practices). Alternative C would close all occupied GRSG habitat to nonenergy mineral leasing and would apply additional protective measures. This alternative would be the most protective of GRSG and its habitat. Alternatives B, E, F, and the Proposed Plan would close PHMA to new leasing. Under Alternatives B, E, and F, existing sites in PHMA would be subject to RDFs and BMPs to reduce impacts to GRSG habitat. Under the Proposed Plan, PHMA would be closed to new nonenergy leases and permits. BLM and the Forest Service would consider expansion of existing operations if the disturbance is within the disturbance cap and subject to compensatory mitigation. GHMA would remain open to new leases subject to stipulations that will protect GRSG including RDFs and BMPs in **Appendix C**, Required Design Features and Best Management Practices.

Table 5-19
Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Open to Nonenergy Leasing				
Alternative A	1,766,000	100%	8,046,000	18%
Alternative B	0	0%	8,046,000	18%
Alternative C	0	0%	6,570,000	0%
Alternative D	1,766,000	100%	8,046,000	18%
Alternative E	0	0%	7,587,000	13%
Alternative F	0	0%	6,603,000	<1%
Proposed Plan	0	0%	8,391,000	22%
Closed to Nonenergy Leasing				
Alternative A	10,827,000	4%	1,750,000	27%
Alternative B	12,593,000	18%	1,751,000	27%
Alternative C	12,593,000	18%	3,227,000	60%
Alternative D	10,827,000	4%	1,750,000	27%
Alternative E	12,593,000	18%	1,597,000	20%
Alternative F	12,593,000	18%	3,194,000	60%
Proposed Plan	12,855,000	20%	1,747,000	27%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA open and closed to nonenergy leasing in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

All Oregon sub-region action alternatives would reduce the effect on GRSG from nonenergy leasable minerals development on BLM-administered lands in MZ IV, though this would be greatest under Alternative C, which would close all occupied habitat to leasing, and to a lesser extent the Proposed Plan, which has the most protective stipulations for leasing in GRSG habitat. However, these actions may shift development onto non-federal lands where such stipulations and/or closures would not apply, with potentially greater impact on GRSG in these areas.

Authorizations of new nonenergy leasable sites that require state agency review or approval would be subject to either the regulatory mechanisms of the Montana, Nevada, or Utah state plans, or the voluntary measures within the Oregon state plans as described above under *Mineral Materials*. These measures would be of particular benefit on privately owned (non-split-estate) surface,

where BLM and Forest Service protective regulatory mechanisms would not apply.

Reasonably foreseeable nonenergy leasable mineral development in MZ IV is expected to increase over the 20-year analysis period (**Section 5.3.12**). However, state and private GRSG conservation efforts as well as other BLM and Forest Service proposed plans in MZ IV would reduce the threat by providing additional protections such as disturbance caps, RDFs, and mitigation. When restrictions within the Oregon RMPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

Recreation

Nature and Type of Effects. The impacts recreation management on GRSG are described in **Section 4.2** and above in **Section 5.3.6**.

Conditions in the Sub-region and in MZ IV. Human populations have increased and expanded, primarily over the past century and in the western portion of the sagebrush distribution (Knick et al. 2011, p. 212). With these expanding populations come greater human impacts (Leu et al. 2008).

The COT report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal GRSG behavior (USFWS 2013a, p. 49). Limits on road use under the action alternatives and limits on OHVs would help meet these objectives.

In the Oregon sub-region, the BLM has designated all BLM-administered lands as open, limited, or closed to OHV travel. This has resulted in the implementation of a system of designated roads and trails whereby cross-country travel is only allowed in specified areas; however, most areas in Oregon are currently designated open. Similarly, the Forest Service has published Motor Vehicle Use Maps for nine National Scenic Areas, National Grasslands, and National Forests in the sub-region. The remaining four National Forests are currently undergoing travel management planning (**Section 3.9**). In other MZ IV sub-regions, travel management planning will soon be underway to determine specific routes available for closure. Route designation criteria focused on reducing impacts on GRSG have been included in the Proposed Plans throughout MZ IV.

Impact Analysis. **Table 5-20** shows Acres of Travel Management Designations in GRSG Habitat in MZ IV.

Table 5-20
Acres of Travel Management Designations in GRSG Habitat in MZ IV

	Priority Habitat Management Areas		General Habitat Management Areas ¹	
	MZ IV	Percent Within Sub-region	MZ IV	Percent Within Sub-region
Open				
Alternative A	1,453,000	100%	1,222,000	>99%
Alternative B	0	0%	1,221,000	>99%
Alternative C	0	0%	1,000	0%
Alternative D	0	0%	1,221,000	>99%
Alternative E	0	0%	751,000	>99%
Alternative F	0	0%	1,221,000	>99%
Proposed Plan	0	0%	1,000	0%
Limited				
Alternative A	9,449,000	8%	7,853,000	9%
Alternative B	10,903,000	21%	7,853,000	9%
Alternative C	10,903,000	21%	9,073,000	21%
Alternative D	10,903,000	21%	7,853,000	9%
Alternative E	10,904,000	21%	7,722,000	8%
Alternative F	10,903,000	21%	7,853,000	9%
Proposed Plan	10,897,000	21%	9,068,000	21%
Closed				
Alternative A	633,000	1%	176,000	7%
Alternative B	633,000	1%	176,000	7%
Alternative C	633,000	1%	176,000	7%
Alternative D	633,000	1%	176,000	7%
Alternative E	631,000	<1%	164,000	0%
Alternative F	633,000	1%	176,000	7%
Proposed Plan	640,000	2%	177,000	7%

Source: BLM 2015

¹ Includes IHMA in the Idaho and Southwestern Montana sub-region.

This table displays the acres of PHMA and GHMA within travel management designations of open, limited and closed in MZ IV; it also displays the percentage of those acres that are found within the sub-region.

As shown in **Table 5-20**, there are slight variations among alternatives in acres closed and limited to motorized vehicles in both PHMA and GHMA. However, the action alternatives would reduce acres open to cross-country travel in PHMA, under which no acres would be open to cross-country motorized vehicle travel; this would greatly benefit GRSG by reducing mortality and habitat

degradation from unrestricted vehicle travel. There would be a similar reduction in GHMA under Alternatives C and the Proposed Plan which would both leave nominal amounts of GHMA open to cross-country travel. By allowing motorized travel over the greatest area of GRSG habitat, impacts on GRSG from motorized vehicle use would be greatest under Alternatives A, B, D, and F; impacts would be reduced most under Alternative C and the Proposed Plan.

Alternatives B, D, and the Proposed Plan would aim to reduce impacts on GRSG by restricting SRPs and SUPs that may have an adverse impact on GRSG. Further, the Proposed Plan would not construct new facilities (campgrounds, trailheads, staging areas) in PHMA unless the development would have a net conservation gain to GRSG. Alternatives E and F would take a similar approach, but with the addition of seasonal restrictions within 4 miles of active leks. Alternatives A, and C would not manage recreation to reduce impacts on GRSG.

Reasonably foreseeable recreation in MZ IV is expected to increase over the 20-year analysis period (**Section 5.3.12**). However, state and private GRSG conservation efforts as well as other BLM and Forest Service proposed plans in MZ IV would reduce the threat by providing additional protections such as disturbance caps and limitations on National Forest System lands. When restrictions within the Oregon RMPA are added to these conservation actions, this would result in a net conservation gain to GRSG habitats and populations in MZ IV.

5.3.11 Conclusions

In addition to BLM management in the Oregon sub-region and other sub-regions in MZs V and IV, GRSG in these MZs will also be impacted by management and conservation at state, regional, tribal and local levels. This analysis takes into account each alternative in the Oregon RMPA in conjunction with state and private initiatives, as well as past, present, and reasonably foreseeable future actions at the federal, state, and local levels. The analysis assumes that the Proposed Plans would be implemented in the other BLM and Forest Service LUPA Sub-regions in MZs V and IV.

Some of the most important past and present actions benefitting GRSG populations on private land in MZ V and IV are the conservation easements coordinated by the NRCS SGI with private ranchers. SGI has also worked with landowners to increase fence marking, seeding of native vegetation, and conifer removal to improve GRSG habitat quality. Future coordination of private landowners with SGI is expected to provide further benefits to GRSG habitat.

Coordination with private landowners enhances conservation in addition to what BLM and Forest Service management can accomplish on federal lands. In addition to SGI conservation easements, other coordination includes CCA or CCAA agreements between the USFWS and private, state, or federal

landowners. CCA or CCAAs covering several million acres are in place or in preparation within MZ V, particularly in the Oregon sub-region.

As discussed in **Sections 5.3.4 and 5.3.8**, Oregon, Nevada, Utah and Montana have adopted statewide plans to promote GRSG conservation. The Montana plan implements a Core Population Area Strategy with well density limitations, timing restrictions, and a uniform 5 percent disturbance cap across all landownership types. These measures would improve GRSG population levels if effectively enforced (Copeland et al. 2013). The Utah executive order directs state agencies whose actions may affect GRSG to implement Utah Division of Wildlife Resources' *Conservation Plan for Greater Sage Grouse in Utah* (Utah Greater Sage-Grouse Working Group 2013). The conservation plan identifies 11 population areas in Utah that are the focus of GRSG conservation efforts, with the goal to protect, maintain, improve and enhance GRSG populations and habitats on public and private lands within the established management areas.

The Oregon and Nevada plans both define key GRSG habitat and provide measures to maintain, enhance or restore habitats for GRSG. In Nevada, this is accomplished through project avoidance, design features, and compensatory mitigation through consultation with the state. While the Nevada plan provides a regulatory mechanism to reduce impacts to GRSG from development on non BLM-administered or National Forest System lands, the Oregon plan generally includes voluntary guidelines. However, the Oregon Governor's natural resources department is currently in the process of developing regulations for GRSG conservation. The forthcoming Sage Grouse Conservation Action Plan will supplement the state plan and provide land use regulations and mitigations for Oregon core habitat areas

Currently, in a majority of MZ V, including the states of California and Oregon, and a majority of MZ IV, including the states of Idaho and Oregon, do not have regulatory mechanisms in place to protect GRSG habitat on non-BLM-administered or National Forest System lands. These states do have GRSG conservation plans, but these plans generally include voluntary guidelines, not regulatory mechanisms. This could allow for more impacts on the 17 percent of GRSG habitat in MZ V and the 31 percent of GRSG habitat within MZ IV that is state or privately owned. Since most GRSG habitat in MZ V (74 percent) and IV (68 percent) is under federal management, BLM and Forest Service regulatory mechanisms will have a substantial contribution to cumulative effects.

BLM and Forest Service restrictions on ROWs, renewable energy, and energy development in GRSG habitat would help reduce loss and disturbance of GRSG populations. The Oregon sub-region Proposed Plan includes numerous measures to allow development while reducing the likelihood for impacts on GRSG, such as requirements for anthropogenic disturbance criteria, a 3 percent disturbance cap, buffers, mitigation, and RDFs and BMPs.

The most challenging threats to manage in MZs V and IV are wildfire, the spread of invasive plants, and conifer encroachment. Fire regimes are complex and vary tremendously across the sagebrush region and through time; furthermore, the ecological role of wildfire has changed dramatically since the European settlement era (circa 1850) due to changing fuel and habitat patterns (Manier et al. 2013, p. 79). Effects of wildfire are exacerbated by invasive plants, particularly in warm-dry sagebrush types, where the invasion by exotic annual grasses has resulted in an increase in the number and frequency of wildfires and decreased fire return intervals to the point where native sagebrush-steppe cannot recover, causing widespread, detrimental effects on habitat conditions (Manier et al. 2013, p. 88). Expansion of conifer woodlands, especially juniper (*Juniperus* spp.) do not provide suitable habitat for GRSG, and mature trees displace shrubs, grasses and forbs through direct competition (Manier et al. 2013, p. 91). These threats are at the landscape scale and are extensive throughout MZs V and IV; the Proposed Plan includes a comprehensive strategy to address these threats.

Alternative A: Current Management

Under Alternative A, current management would continue on BLM-administered lands in the Oregon sub-region. Several protective measures would not be implemented; for example, the BLM would not designate PHMA or GHMA and would not manage any additional ROW avoidance or exclusion areas. Alternative A does not include any consistent management prescriptions to protect GRSG across the sub-region, though several individual BLM district offices have existing protections in place. Appropriate and allowable uses and restrictions with regard to such activities as mineral leasing and development, recreation, utility corridors, and livestock grazing would also remain unchanged.

Under current management, widespread wildfire and subsequent spread of invasive plants has destroyed and degraded GRSG habitat in MZs V and MZ IV. Under Alternative A this trend would likely continue. Further, the expansion of conifers at a rate exceeding treatment rates, particularly juniper, will continue to reduce the suitability of sagebrush habitats for GRSG.

Under Alternative A, other BLM and Forest Service LUPA planning efforts in MZs V and IV would implement their Proposed Plans to improve protection of GRSG and their habitat in the non-Oregon sub-region portion of MZs V and IV. In addition, GRSG conservation strategies would be implemented on state and private lands under the various state plans, CCA and CCAAs, and efforts such as the NRCS SGI. As a result, the lack of protections under the Oregon RMPA Alternative A would be offset to an extent by more protective management elsewhere in the MZs. In the Oregon sub-region, though, continuation of current management would do little to reduce the major threats to GRSG in the sub-region: wildfire, invasive plants, and conifer encroachment. Current management provides a limited number and extent of regulatory mechanisms to avoid continued degradation of GRSG habitat in MZs V and IV; however current

management would not meet the COT report objectives for conservation of GRSG.

Current management direction does not explicitly address all elements of the COT report objectives. While nothing in the existing LUPs prevents vegetation treatments intended to address the threats of invasive plant spread, conifer encroachment and wildfire, there is less certainty that GRSG habitat would be the focus of management effort concerning these threats. Current management allows for more development than recommended by the COT report, potentially leading to greater fragmentation and increased risk that the unintentional spread of invasive plants would be facilitated.

Alternative B

Under Alternative B, the BLM would manage lands to conserve, enhance, and restore sagebrush ecosystems. In conjunction with NRCS and state initiatives on private land, several aspects of BLM management under Alternative B would benefit GRSG conservation at a landscape level. These include designation of PHMA and GHMA, implementation of a 3 percent disturbance cap, retention of GRSG habitat, restrictions on resource uses such as managing PHMA as ROW exclusion and recommended for locatable mineral withdrawal, managing grazing and free-roaming equids using GRSG habitat objectives, and prioritizing restoration in GRSG habitat. Implementing these protective measures on BLM-administered lands within the Oregon sub-region would help reduce damage to GRSG habitat, minimize loss of connectivity and could also minimize the spread of invasive plants by limiting human activities that disturb soil or introduce seeds. However, such restrictions could also risk pushing development onto adjacent, nonfederal lands with less restrictive management where land ownership patterns are mixed. This is particularly a concern where nonfederal lands have fewer protections (e.g., the 17 percent of GRSG habitat in MZ V and the 31 percent of GRSG habitat within MZ IV that is state or privately owned). In parts of MZ IV, some nonfederal lands have similarly restrictive measures such as in Core areas in Montana and Nevada and GRSG Management Areas in Utah, which would reduce the likelihood for impacts in these areas.

In combination with other past, present, and reasonably foreseeable future actions, Alternative B would likely meet the objectives laid out in the COT report for invasive plants, infrastructure, grazing and free-roaming equids, conversion to agriculture, energy development, and recreation. Without a comprehensive strategy to address wildfire, and conifer encroachment, it may not meet the COT objectives for these major threats.

Alternative C

Under Alternative C, the BLM would manage lands to conserve, enhance, and restore sagebrush ecosystems and would apply management to all occupied GRSG habitats, making it the most restrictive alternative for development in GRSG habitat. Alternative C relies on passive management for vegetation

restoration efforts, which has shown no ability to reduce or halt the spread of invasive plants or to promote recovery of native plant communities where invasive plants are dominant. In conjunction with NRCS and state initiatives on private land, several aspects of BLM management under Alternative C would benefit GRSG conservation at a landscape level. These include implementation of a 3 percent disturbance cap, removal of livestock grazing from BLM-administered and National Forest System lands, and closure to leasable mineral development. Impacts would be similar to those described for Alternative B, but could be greater due to the larger area over which restrictions would be applied.

Together with other past, present, and reasonably foreseeable future actions, Alternative C would likely meet the objectives laid out in the COT report for infrastructure, conversion to agriculture, energy development, and recreation. Without a comprehensive strategy to address wildfire, invasive plants, and conifer encroachment, it may not meet the COT objectives for these major threats. Further, it is unknown whether removal of grazing would meet the COT objectives for range management, as analyzed above and in greater detail in **Section 4.2**.

Alternative D

Under Alternative D, the BLM would manage lands to conserve, enhance, and restore sagebrush ecosystems. Management and impacts would be similar to Alternative B, though Alternative D would incorporate more flexibility and adaptive management applied to resource uses to account for sub-regional conditions. The BLM would require a no net unmitigated loss of PHMA and would implement numerous conservation measures to reduce impacts from human activities in PHMA, such as management of GRSG habitat as ROW avoidance areas and closure to some mineral development. Alternative D also includes additional measures and planning for wildland fire management.

Under Alternative D, the BLM would increase GRSG habitat protection over current management, but with less restrictive actions than under Alternatives B or C. In conjunction with state and regional planning efforts, implementation of state measures in GRSG core areas in Nevada and Montana, and in GRSG Management Areas in Utah, conservation easements on private lands, implementation of other BLM and Forest Service LUPAs in MZs V and IV, and other past, present, and reasonably foreseeable future actions, Alternative D would likely meet the objectives laid out in the COT report for wildfire, invasive plants, infrastructure, livestock grazing and free-roaming equids, conversion to agriculture, energy development, and recreation. Without a comprehensive strategy to address conifer encroachment, it may not meet the COT objectives for these major threats.

Alternative E

Under Alternative E, the BLM would manage lands to maintain, conserve, enhance, and restore sagebrush ecosystems. In PHMA and GHMA, the BLM would incorporate management flexibility to permit high value infrastructure with appropriate mitigation and best management practices tailored for the sub-region. Management and impacts are similar to Alternative D, though Alternative E would require less stringent use restrictions compared to the other alternatives' management area designations. Alternative E also includes additional measures and planning for wildland fire management.

Under Alternative E, the BLM would increase GRSG habitat protection over current management, but with less restrictive actions than under Alternatives B, C, or D. In conjunction with state and regional planning efforts, implementation of state conservation measures in GRSG core areas, conservation easements on private lands, implementation of other BLM and Forest Service LUPAs in MZs V and IV, and other past, present, and reasonably foreseeable future actions, Alternative E would likely meet the objectives laid out in the COT report for wildfire, infrastructure, livestock grazing and free-roaming equids, mining, energy development, conversion to agriculture, and recreation. Without a comprehensive strategy to address invasive plants and conifer encroachment, it may not meet the COT objectives for these major threats.

Alternative F

Management under Alternative F would be largely similar to that described for Alternative B, though with more stringent guidance and restrictive management in sagebrush ecosystems. Alternative F would implement a 3 percent disturbance cap but all surface disturbances (including human disturbance and wildfire) would count toward this cap. In addition, livestock grazing would be reduced by 25 percent.

In combination with other past, present, and reasonably foreseeable future actions, Alternative F would likely meet the objectives laid out in the COT report for invasive plants, infrastructure, livestock grazing and free-roaming equids, conversion to agriculture, energy development, and recreation. Without a comprehensive strategy to address wildfire, and conifer encroachment, it may not meet the COT objectives for these threats.

Proposed Plan

Under the Proposed Plan, the BLM would manage lands to conserve, enhance and restore GRSG habitat and the sagebrush ecosystem upon which GRSG populations depend. Management and impacts would be similar to Alternatives D and E, though the Proposed Plan would incorporate robust strategies and approaches to GRSG management, including wildfire and invasive plant management, conifer removal, adaptive management, mitigation, a 3 percent disturbance cap, with no more than 1 percent per decade, anthropogenic disturbance criteria, buffers, habitat objectives, and monitoring. In addition to

habitat management areas, SFA would also be managed to protect recognized the most important areas for the species. In addition, the Proposed Plan provides vegetation treatment acres by decade sufficient to meet desired habitat conditions (70% of the analysis area meeting 10-30% sagebrush cover) (NTT 2011).

The Proposed Plan would provide a higher level of GRSG habitat protection compared to current management, while allowing flexibility for resource uses when there would be no impacts to GRSG.

In the rest of MZ V and IV, other BLM/USFS RMPA/LUPA planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in **Section 5.3.5** and **Section 5.3.8**, would be implemented on non-federal lands. Reasonably foreseeable future actions in MZs V and IV such as proposed wind energy projects, geothermal development, vegetation management projects, interstate transmission lines, and other land disturbance projects would be subject to the requirements set forth in the BLM/USFS Proposed Plans which encompass the MZs, where those projects occur on federal decision area lands. For non-federal lands, reasonably foreseeable future projects may be subject to measures of GRSG state plans, as well as site specific mitigation.

In conjunction with state and regional planning efforts, implementation of state conservation measures in GRSG core areas, conservation easements on private lands, implementation of other BLM and Forest Service LUPAs in MZs V and IV, and other past, present, and reasonably foreseeable future actions, the Proposed Plan would likely meet the objectives laid out in the COT report for wildfire, invasive plants, conifer encroachment, livestock grazing and free-roaming equids, conversion to agriculture, and recreation. Specifically, the following measures which would be implemented under the Proposed Plan, or are considered reasonably foreseeable future actions, would help meet COT report objectives:

- By prioritizing and conducting vegetation treatments based on GRSG habitat objectives the Proposed Plan would increase the resistance of GRSG habitat to invasive annual grasses and the resiliency of GRSG habitat to disturbances such as wildfire and climate change to reduce habitat loss and fragmentation and help meet the COT report objective for wildfire;
- By reducing the area dominated by invasive annual grasses around leks and using integrated vegetation management to control, suppress, and eradicate invasive plant species, the Proposed Plan would help meet COT report objective for invasive plants;
- By reducing or eliminating encroaching conifer cover near leks at a rate at least equal to the rate of encroachment, the Proposed Plan

would help meet the COT report objective for conifer encroachment;

- By managing livestock grazing and free-roaming equids to maintain or improve GRSg habitat, including prioritizing rangeland health assessments in GRSg habitat and completing assessments for GRSg habitat indicators within HMAs, the Proposed Plan would help meet COT report objectives for livestock grazing;
- By generally retaining GRSg habitat in land tenure transactions, the Proposed Plan would reduce fragmentation of GRSg habitat and help meet COT report objectives for agricultural conversion;
- By managing travel designations to conserve GRSg habitat and populations, the Proposed Plan would help meet COT report objectives for recreation.
- Continued implementation of the NRCS SGI would help meet the COT objective for the threat of agriculture conversion, by securing conservation easements on private lands. Fence marking, implementing prescribed grazing systems, and vegetation seeding would help meet the COT objectives for range management structures, grazing, and nonnative, invasive plant species.
- Implementation of state conservation plans and/or state executive orders would help meet all COT report objectives, particularly on non-BLM and non-National Forest System lands.

Summary

Overall, GRSg populations across MZs V and IV face the greatest pressures from wildfire, invasive plants, conifer encroachment, and face additional pressures from energy development including wind and geothermal, and infrastructure. Due to the amount of federal lands in the MZs, BLM-administered lands in particular, relative to other land ownerships, BLM actions within the Oregon sub-region would substantially contribute to cumulative effects on populations and habitats within both MZ V and MZ IV.

Threat reduction for wildfire is difficult and costly. Given the intensity and widespread distribution of the threat, it may never be fully eliminated (USFWS 2013a, p. 40), but the comprehensive strategies under the Proposed Plan may be able to reduce the threat considerably.

Infrastructure projects are also of particular concern in MZ IV, because such projects affect a large amount of land. Numerous multi-state transmission lines are proposed through GRSg habitat, as are utility-scale wind projects. Implementation of the BLM/USFS Proposed Plans in MZ IV is unlikely to preclude such projects from proceeding, especially Presidential Priority transmission line projects that are not subject to GRSg protective measures in this BLM/USFS planning effort. However, GRSg protective measures are being

considered in the project-specific analyses for these projects. The cumulative effect of the conservation measures in the Proposed Plan will result in protection of GRSG populations. Some small, localized populations may be at continued risk due to the cumulative effect of reasonably foreseeable future infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfires, drought, and associated decline in GRSG habitat quality. . However, the RMPA restrictions on land use in combination with project-specific BMPs and RDFs and other regional efforts, would achieve an overall net conservation for the regional population and would help mitigate the effects on small, at-risk populations.

The Oregon sub-region in MZ V contains one of the GRSG strongholds (along with MZs III and IV) with the largest area of habitat range wide with low similarity to extirpated portions of the range (USFWS 2013a, p. 80). As such, management within the sub-region and MZ is critical to preserving the species. All action alternatives considered in the Oregon RMPA would reduce threats to some degree and via different strategies.

Although small at-risk populations may continue to decline in the next 20 years, implementing the Proposed Plan in combination with other regional efforts (such as the Proposed Plans for other BLM/Forest Service Sub-regions; conservation strategies in state plans; increased land protections via NRCS SGI, and local habitat restoration efforts) would effectively conserve the region-wide GRSG population in MZs V and IV. Because Alternatives B, C, D, E, and F lack comprehensive strategies to manage wildfire, invasive plants, and/or conifer encroachment, these alternatives likely would not effectively conserve the region-wide GRSG population in MZs V and IV.

5.3.12 MZ-Wide Reasonably Foreseeable Future Actions Summary Tables

Table 5-21 and **Table 5-22** include a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZs V and IV. The full tables can be found in each EIS within each MZ.

Table 5-21
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Energy and Mining						
V	Oregon	Western Great Basin; Central Oregon	Wagon Tire Wind Energy Development Project	Harney County, OR	Develop a wind farm.	Planning phase
V	Oregon	Western Great Basin	Buckskin Mountain Wind Energy Development Project	Harney County, OR	Develop a wind farm.	Planning phase
V	Oregon	Western Great Basin	Locatable Mining	Lake, Oregon	Two areas in the Lakeview RA, where locatable mining activity is ongoing, either will continue or will expand in the near future; Tucker Hill and Rabbit Basin Sunstone areas. Tucker Hill, active 23-acres perlite mine, authorized to expand to 75 acres. Rabbit Basin Sunstone area; approximately 43 open notices and plans of operations for sunstone mines currently affecting 61 acres. Three to five new open notices received or plans of operations approved each year, for up to 25 acres of additional disturbance added each year.	Ongoing
Lands and Realty						
V	Oregon	Western Great Basin; Northern Great Basin	North Steens 230-kV Transmission Line Project	Harney County, OR	North Steens is a 29-mile 230-kV transmission line that would convey 104 MW of power generated from wind farms proposed on private land on the north side of Steens Mountain.	Project approved and ROD signed in December 2011; in litigation.
V	Oregon	Western Great Basin; Central Oregon	Pacific Direct Intertie Upgrade and Maintenance	Deschutes and Lake, Oregon	Maintain and upgrade the existing Bonneville Power Administration power line from Columbia River south to the northern Nevada border.	Ongoing

Table 5-21
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
V	Oregon	Central Oregon	West Butte Wind Power ROW	32 miles east of Bend, Oregon	The West Butte Wind Power ROW Project includes a permanent 4.5-mile access road, a pole-mounted 115-kV electrical transmission line, a 14.4-kV electrical utility line that would convey 104 MW of power generated from 52 wind turbines proposed on private land.	NEPA and ROD completed 2011. Implementation date unknown.
Fuels and Vegetation						
V	Nevada and Northeastern California	Western Great Basin	Vya Population Management Unit Programmatic Habitat Restoration and Fuels Reduction Project	Northeast California/ Northwest Nevada	Up to a total of 100,000 acre of treatment over a 10-year period. A combination of juniper thinning or removal and prescribed burning. 16,274 acres identified for prescribed fires and up to 83,726 acres of juniper treatment.	Planning phase
V	Nevada and Northeastern California	Western Great Basin	NE California Juniper Treatments	Northeast California/ Northwest Nevada	Multiple juniper removal treatments throughout the Alturas, Surprise and Eagle Lake Field Offices. Total 32,099 acres.	Ongoing
V	Nevada and Northeastern California	Western Great Basin	Northeast California Prescribed Fires	Northeast California/ Northwest Nevada	Multiple prescribed fire treatments throughout the Alturas, Surprise and Eagle Lake Field Offices. Burns include broadcast timber understory burns, Aspen regeneration, pile burns and small meadow broadcast burns. A total of 3,015 acres.	Ongoing
V	Oregon	Western Great Basin	North Steens Ecosystem Restoration Project	Steens Mountain Cooperative Management and Protection Area, OR	Treat expansion western juniper on a landscape scale, encompassing approximately 336,000 acres CMPA to return vegetation communities to historic compositions and reduce hazardous fuel loads.	Ongoing
V	Oregon	Central Oregon	Vegetation Treatments	Three Rivers Resource Area, OR	A number of vegetation and fuels treatments projects to control expansion of juniper and ponderosa pine and reducing fuels.	Ongoing

Table 5-21
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
V	Oregon	Western Great Basin; Northern Great Basin	Five Creeks Rangeland Restoration Project	Three Rivers and Andrews/ Steens Resource Areas, OR	A landscape-scale vegetation treatment encompassing approximately 73,500 acres (approximately 26,000 acres in the CMPA) to return vegetation communities to historic compositions and reduce hazardous fuel loads. Various forms of prescribed fire and mechanical treatments have been used to reduce influence of encroaching western juniper.	Ongoing
V	Oregon	Western Great Basin; Central Oregon	District-wide noxious weed treatments	Harney County, OR	Interagency noxious weed treatment efforts with Oregon Department of Agriculture and Harney County.	Ongoing
V	Oregon	Western Great Basin	Several ES&R Projects	Andrews Resource Area, OR	Rehabilitation following wild fire.	Ongoing
V	Oregon	Western Great Basin	South Warner Sagebrush Sage-Grouse Habitat Restoration	Lake, OR	Juniper removal from a 50,000-acre South Warner Rim project area adjacent to the pipeline.	Ongoing
V	Oregon	Central Oregon	High Desert Shrub Steppe EA	Between Millican and Hampton, OR	Cut or burn up to 10,000 acres of juniper per year.	Ongoing
Livestock Grazing						
V	Oregon	Central Oregon	Multiple grazing permit renewals	Prineville District, OR	Renew 37 grazing permits and leases. Effects on local economy, wildlife.	Planning phase
Wild Horses and Burros						
V	Oregon	Western Great Basin; Central Oregon	Wild Horse Gathers	District-wide, OR	Gather wild horses.	Ongoing

Table 5-21
Reasonably Foreseeable Future Actions in Management Zone V Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Recreation						
V	Oregon	Western Great Basin	Steens Mountain Comprehensive Recreation Plan	Steens Mountain Cooperative Management and Protection Area, OR	Multiyear plan to manage recreation on Steens Mountain, including maintaining facilities, creating new facilities and trails, closing roads, and providing interpretation.	Planning phase

This table includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZ V. The full tables can be found in each EIS.

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Energy and Mining						
IV	Idaho and Southwestern Montana	Northern Great Basin	Sawtooth #4 Plan of Operation Modification	Twin Falls District, Idaho	Locatable mineral surface mining over 20 acres.	NEPA in progress.
IV	Idaho and Southwestern Montana	Northern Great Basin	Mineral Extraction	Dillon Field Office, Montana	Approximately 25 notices for locatable mineral extraction covering less than 50 acres.	Ongoing
IV	Idaho and Southwestern Montana	Northern Great Basin	Quarry Expansions	Sawtooth National Forests, Utah and Idaho	Several quarry expansions covering 40 acres total.	Planned for 2016.
IV	Idaho and Southwestern Montana	East Central	Dairy Syncline Phosphate Mine	Soda Springs, Idaho	Phosphate mine on estimated 580 acres (281 acres of open pit) within PGH/PHMA.	Planning phase
IV	Idaho and Southwestern Montana	Northern Great Basin	Oil and gas lease nominations	Rogerson-Brown's Bench, Idaho	Determine whether to offer leases on up to 90,000 acres.	Deferred, pending completion of Jarbidge RMP and GRSG EIS

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and Southwestern Montana	East Central	Oil and gas lease nominations	Payette-Weiser area, Idaho	Determine whether to offer oil and gas leases. Several nominations, totaling an estimated 181,000 acres.	Deferred, pending completion of Four Rivers RMP and GRSG EIS
IV	Oregon	Northern Great Basin	Malheur Queen Placer Project	North-central Malheur County, Oregon	Approximately 800 acres approved for development of placer gold extraction.	Development underway
IV	Oregon	Northern Great Basin	High Bar/Upper and Lower Pine Creek Placer Mining Project	Baker County, Oregon	Up to 250 acres of activity would be disturbed for mineral extraction.	Planning phase
IV	Nevada	Northern Great Basin	Round Mountain Gold Mine			
Expansion	Nye County, Nevada	Expansion of existing facilities at the Round Mountain Mine and development of new mining and leaching facilities at the adjacent Gold Hill ore deposit.	Planning phase			
IV	Nevada	Northern Great Basin	Angel Wing Exploration Plan	60 miles northwest of West Wendover, Nevada, on the Utah/Nevada State Line	Expansion of mining exploration activities, including construction of drill pads and access roads and existing road maintenance, from a 3.3 acre Notice to 60 acres. Access to the proposed Plan is through Utah near the town of Grouse Creek.	Planning phase

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Nevada	Northern Great Basin	Murdock Mountain Phosphate Prospecting Permit	35 miles northwest of West Wendover, Nevada, and 10 miles southwest of Montello, Nevada	Phosphate exploration drilling and trenching in the Murdock Mountain area. The operator is proposing to construct 31 drill pads with 2 drill holes per pad and 29 exploration trenches measuring 100 feet long by 5 feet wide by 5 feet deep. Exploration roads will also be constructed and existing roads will be utilized. Exploration operations are anticipated to take 200 days to complete.	Planning phase
Lands and Realty						
IV	Idaho and Southwestern Montana	Northern Great Basin; Snake-Salmon-Beaverhead	Gateway West 230/500 Transmission Line Project	Wyoming, Southern Idaho	Authorize ROW for 1,100-mile 500-kV transmission line.	Pending; Scheduled for implementation starting 2016
IV	Idaho and Southwestern Montana; Oregon	Baker; Northern Great Basin	Boardman to Hemingway Transmission Line Project	From Boardman, Oregon to Melba, Idaho	A proposal for an approximately 300-mile 500-kV transmission line.	Project under NEPA review.
IV	Oregon	Northern Great Basin	North Steens 230-kV Transmission Line Project	Harney County, Idaho	North Steens is a 29-mile 230-kV transmission line that would convey 104 MW of power generated from wind farms proposed on private land on the north side of Steens Mountain.	Project approved and ROD signed in December 2011; in litigation.
IV	Nevada	Northern Great Basin	China Mountain Wind Project	Northeastern Nevada	Utility-scale wind facility	Temporarily deferred pending NVCA GRSG EIS
IV	Idaho and Southwestern Montana	Northern Great Basin	Owyhee Land Exchange	Western Owyhee County, Idaho	Proposing to dispose of approximately 33,000 acres of non-GRSG habitat and acquiring around 38,000 acres of primarily GRSG habitat	Proposal

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
Fuels and Vegetation						
IV	Idaho and Southwestern Montana	Northern Great Basin	Juniper Treatments in Pole Creek Allotment	Owyhee Field Office, Idaho	Juniper removal to enhance resource conditions on 24,486 acres of public, private, and state lands.	Decision issued; treatment implementation pending litigation
IV	Idaho and Southwestern Montana	Northern Great Basin	Juniper Treatment in Trout Springs Allotment	Owyhee Field Office, Idaho	Juniper removal to enhance resource conditions on 29,475 acres of public, private, and state lands.	Planning
IV	Idaho and Southwestern Montana	Northern Great Basin	Upper Castle Creek Fuels Project	Bruneau Field Office, Idaho	Juniper control project on approximately 33,000 acres. 25,000 acres implemented; anticipate 2,000-4,000 acres per year for the remaining areas.	Ongoing through 2014
IV	Idaho and Southwestern Montana	Northern Great Basin	Curlew Fuel Breaks and Juniper Reduction Project	Southeast Idaho	Compartmentalize the Curlew area using existing roads to improve wildfire suppression and reduce wildfire growth over 60,000 acres. Efforts will help to retain existing intact Wyoming sagebrush habitat. Remove encroaching junipers from within Wyoming sagebrush.	Planning; project implementation anticipated in 2017.
IV	Idaho and Southwestern Montana	Northern Great Basin	Burley Landscape Sage-Grouse Habitat Restoration	Burley Field Office, Idaho	Treat encroaching juniper on approximately 38,000 acres.	Approximately 8,500 acres already completed; implementation of remaining 29,500 acres expected over the next 7 years

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Paradigm Project	Four Rivers Field Office, Idaho	Fuel break project that would create up to 294 miles of fuel breaks between 50 and 300 feet wide over a 10-year period. Fuel breaks would be associated with roads and other linear disturbances. At the maximum width of 300 feet, up to 10,690 acres would be directly affected. 2,111 acres of PPH/PHMA and 24,667 acres of PGH/GHMA in project area; fuel breaks would affect 61 acres of sagebrush in PPH/PHMA and 606 acres in PGH/GHMA.	Pending
IV	Idaho and Southwestern Montana	Northern Great Basin	South Owyhee Fuel Breaks	Boise District, Idaho	Fuel breaks over 2,000,000 acres, 850 miles.	Draft EA
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Big Desert Fuel Breaks	Idaho Falls and Twin Falls Districts, Idaho	Compartmentalize the Big Desert management area using existing roads to improve wildfire suppression and reduce wildfire growth; efforts will help to retain intact Wyoming sagebrush habitat within the northern portion of the management area. 291 miles of existing desert roads with a footprint of 10,581 acres. Upper Snake Field Office: 245 miles of roads with 8,908 footprint acres. Shoshone Field Office: 46 miles of roads with 1,673 footprint acres.	NEPA is complete and project began in 2012 within the Upper Snake Field Office; those fuel breaks identified within the Shoshone Field Office require further analysis and consultation before NEPA can be finalized.
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Big Desert Noxious Weed Treatments	Idaho Falls District, Idaho	Treating noxious weeds within the Big Desert management area over 600,000 acres. Annual treatment target of 5,000 acres.	Ongoing, began in 2006.

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Cheatgrass Treatments	Idaho Falls District, Idaho	Chemically reduce cheatgrass densities over 7,000 acres to modify fire return intervals and allow for seeded native species to become established.	Planning phase
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Salmon-Challis National Forest Forest-wide Invasive Plant Treatment EIS	Salmon-Challis National Forest	Programmatic noxious weed treatment planning within the nonwilderness portion of the Salmon-Challis National Forest (3.2 million acres)	Planning phase
IV	Idaho and Southwestern Montana	Northern Great Basin	Twin Falls District Noxious Weed and Invasive Plant Treatments	Twin Falls District, Idaho	Proposed action is to use prevention, prescribed fire, herbicides, and manual, mechanical, and biological methods to treat areas dominated by annual invasive plants to restore perennial grasses, forbs, and shrubs. This is a programmatic planning effort. Estimated annual restoration is 5,000-10,000 acres in Burley Field Office (FO), 10,000-15,000 acres in Shoshone FO, and 10,000-15,000 acres in Jarbidge FO. Ten-year total for each office could approach 100,000 acres in Burley FO, 150,000 acres in Shoshone FO, and 150,000 acres in Jarbidge FO.	Planning phase. Implementation is planned to cover 10 years starting in 2015.
IV	Idaho and Southwestern Montana	Northern Great Basin	Shrub Planting	Twin Falls District, Idaho	Reintroduction of shrub species through hand planting of seedlings; up to 200,000 seedlings (13,000 acres) may be planted annually.	Implementation since 2010 and expected to continue over the next 10 years.

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and Southwestern Montana	Northern Great Basin	Twin Falls District Wildlife Tracts Restoration	Twin Falls District, Idaho	Proposed action is to use prescribed fire, chemical, drill and harrow seeding, shrub seeding, and plantings to establish perennial vegetation and restore native shrub habitat on wildlife tracts. 500-1,000 acres per year, for a cumulative total of 10,000 acres over ten years.	Implementation has been occurring since 2011 and is planned to continue over the next 8 years.
IV	Oregon	Northern Great Basin	Five Creeks Rangeland Restoration Project	Three Rivers and Andrews/Steens Resource Areas, Oregon	A landscape-scale vegetation treatment encompassing approximately 73,500 acres (approximately 26,000 acres in the CMPA) to return vegetation communities to historic compositions and reduce hazardous fuel loads. Various forms of prescribed fire and mechanical treatments have been used to reduce influence of encroaching western juniper.	Ongoing
IV	Oregon	Northern Great Basin	Multiple restoration projects	Three Rivers Resource Area, Oregon	Implementation plans include thinning, piling, pile burning, and implementing a forest underburn.	Ongoing
IV	Oregon	Northern Great Basin	District-wide noxious weed treatments	Oregon	Ongoing interagency noxious weed treatment efforts with Oregon Department of Agriculture and Oregon counties.	Ongoing
IV	Oregon	Northern Great Basin	District-wide Vegetation Management (Weed EA)	Harney County, Oregon	Use new chemicals to treat noxious and invasive plants.	Planning phase
IV	Oregon	Baker; Northern Great Basin	Baker Habitat Restoration and Fuels Treatment projects	Baker County, Oregon	Multi-year phased hazardous fuels and wildlife habitat restoration project on approximately 45,000 acres.	Planning phase
IV	Utah	Box Elder	Noxious weed treatments	Utah	Treating noxious weeds	Ongoing

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Nevada	Northern Great Basin	Santa Rosa Fuels Project	Winnemucca District, Nevada	355,699 acre Sub-region to reduce wildfire threat and improve wildlife habitat.	Ongoing
IV	Nevada	Northern Great Basin	North Tuscarora Sage-Grouse Habitat Restoration Project	Elko District Office, Nevada	Restoration of up to 10,000 acres of GRSG habitat. Treatments would improve, protect GRSG habitat, protect PPH/PHMA, protect Lahontan Cutthroat Trout Streams, improve wildlife habitat, reduce invasive plants, and reduce hazardous fuels.	Planning phase
IV	Nevada	Northern Great Basin	Spruce Mountain Project	Elko District Office, Nevada	Spruce Mountain seeding maintenance over 700 acres. Mastication and seeding to reduce wildfire threat and improve wildlife habitat.	Ongoing
Livestock Grazing						
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Grazing Permit Renewals	Challis Field Office	Renewing/modifying 2 to 5 grazing permits per year for the next ten years over 770,000 acres	Project under NEPA review.
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Range NEPA for C&H allotments	Boise National Forest, Idaho	Allotments cover over 53,000 acres.	Projects under NEPA review.
IV	Idaho and Southwestern Montana	Northern Great Basin	Allotment Management Plan Updates	Sawtooth National Forest, Idaho and Utah	Cattle and sheep allotment management plan updates on over 350,000 acres.	Ongoing
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Allotment Management Plan Updates	Sawtooth National Forest, Idaho	Cattle and sheep allotment management plan updates on over 140,000 acres.	Ongoing
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Grazing Allotment Management NEPA	Salmon-Challis National Forest	Grazing allotment management NEPA on over 2 million acres.	Ongoing
IV	Idaho and Southwestern Montana	Southwest Montana	Cessation of Lima-Tendoy Sheep Grazing	Beaverhead-Deerlodge National Forest	Permittee waiving sheep permits on 11,700 acres in PPH/PHMA back to Forest Service. Allotments will be closed to future domestic sheep grazing. No new grazing permits for any livestock will be issued for the Indian Creek Allotment. Three-year trial of 100 AUMs fall cattle grazing for Bear Canyon.	Ongoing. NEPA review and new AMP after 2015 grazing season.

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Nevada	Northern Great Basin	White Rock Mountain Aspen Exclosures	Northeastern Nevada	Place up to nine exclosures around aspen stands to protect from overgrazing by livestock.	Planning process
IV	Utah	Box Elder	Fence marking	Utah	The NRCS is planning to mark fences within 3.2 miles of leks throughout Utah on private lands.	Ongoing
Wild Horses and Burros						
IV	Idaho and Southwestern Montana	Northern Great Basin	Wild horse gathers	Owyhee Field Office, Idaho	Gather, fertility treatment, removal of excess wild horses from HMAs. Covers 128,389 acres of public and other (private and state) land.	EAs and decisions have been approved; gathers and treatment are pending due to funding and other priority treatments within the BLM wild horse program.
IV	Oregon	Northern Great Basin	Wild horse gathers	Oregon	Gather wild horses.	Ongoing
Recreation						
IV	Idaho and Southwestern Montana	Northern Great Basin	Special Recreation Permits	Owyhee Field Office, Idaho	Various motorcycle, foot, and mountain bike races, horse endurance rides, dog trials, pioneer treks, and poker runs on 260,000 acres.	Ongoing
Travel Management						
IV	Idaho and Southwestern Montana	Northern Great Basin	Curlew/Deep Creek Travel Management Plan Implementation	Idaho Falls District, Idaho	Implement Travel Management Plan on 375,000 acres; limit motorized travel to designated routes, prohibit cross-country travel	Ongoing

Table 5-22
Reasonably Foreseeable Future Actions in Management Zone IV Likely to Impact GRSG Habitat

MZ	Sub-region	Affected GRSG Population	Project Name	Project Location	Project Description	Project Status
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	North Highway 20 Travel Plan	Idaho Falls District, Idaho	Designate 127 miles of existing trails; construct 52 miles of new trails, construct 3 acres of parking areas, close and rehabilitate 116 miles of existing routes.	Pending
IV	Utah	Box Elder	Motorized Travel Plan Implementation	Utah	Implementation of motorized route designation plans across the planning region.	Ongoing
Land Use Planning						
IV	Idaho and Southwestern Montana	Northern Great Basin	Jarbridge RMP	Jarbridge Field Office, Idaho	Revise the Jarbridge RMP that provides a comprehensive plan for 1,366,000 acres that further restores or maintains resource conditions and provides for the economic needs of local communities over the long term	Ongoing
IV	Idaho and Southwestern Montana	Snake-Salmon-Beaverhead	Craters LUP Amendment	Craters of the Moon National Monument and Preserve, Idaho	Analyze a range of alternatives for livestock grazing in the Craters of the Moon covering 300,000 acres (i.e., identify lands available or unavailable for grazing, identify the amount of forage available, seasons of use, range improvements)	Ongoing

This table includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZ IV. The full tables can be found in each EIS.

5.4 CUMULATIVE ANALYSIS METHODOLOGY

The cumulative impacts discussion that follows considers the alternatives in the context of the broader human environment, specifically, actions that occur outside the scope and geographic area covered by the planning area. Cumulative impact analysis is limited to important issues of national, regional, or local significance.

Because of the broad nature of the RMPA and cumulative assessment, the analysis tends to be broad and generalized to address effects that could occur from a reasonably foreseeable management scenario, combined with other reasonably foreseeable activities or projects. Consequently, this assessment is primarily qualitative for most resources because of a lack of detailed information that would result from project-level decisions and other activities or projects.

Quantitative information is used whenever available and as appropriate to portray the magnitude of an impact. The analysis assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same geographic area. The magnitude of an impact is determined through a comparison of anticipated conditions against the naturally occurring baseline in the affected environment (see **Chapter 3**, Affected Environment) or the long-term sustainability of a resource or social system.

The following factors were considered in this cumulative impact assessment:

- Federal, nonfederal, and private actions
- Potential for synergistic effects or synergistic interaction between effects
- Potential for effects across political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative scale of cumulative impacts across alternatives

Temporal and spatial boundaries used in the cumulative analysis are developed on the basis of resources of concern and actions that might contribute to an impact. The baseline date for the cumulative impacts analysis is 2012; the temporal scope of this analysis is a 20-year planning horizon. Land use planning documents are generally evaluated on a 10-year cycle.

In 1954 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of GRSG. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of GRSG population losses and degradation of sagebrush ecosystems. The BLM, USFWS, and US Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000 (Stiver et al. 2006).

WAFWA entered into a contract with the USFWS in 2002 to produce a complete conservation assessment for GRSG and its habitat. *Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006) is one of the results of the assessment and is a conservation strategy for GRSG and sagebrush habitats. Seven WAFWA Management Zones are established based on GRSG populations within floristic provinces. Floristic provinces (Connelly et al. 2004) were used to delineate Management Zones because they reflect ecological and biological issues and similarities, not political boundaries. In addition, the vegetation communities found in the floristic provinces, as well as the management challenges, within a Management Zones are similar; GRSG and their habitats are likely responding similarly to environmental factors and management actions (Stiver et al. 2006).

Spatial boundaries vary and are larger for resources that are mobile or migrate (e.g., migratory birds) compared with stationary resources. Occasionally, spatial boundaries could be contained within the planning area boundaries or an area within the planning area. Spatial boundaries were developed to facilitate the analysis and are included under the appropriate resource section heading. The cumulative effects analysis for all topics included an analysis of cumulative effects at the planning area level. For GRSG in Oregon, it included an analysis at the WAFWA Management Zones 4 and 5, in addition to the planning level analysis. WAFWA Management Zones are biologically based delineations that were determined by GRSG populations and subpopulations identified within seven floristic provinces. Analysis at this level enables the decision maker to understand the impacts on GRSG at a biologically meaningful scale.

5.5 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past, present, and reasonably foreseeable future actions are considered in the analysis to identify the following:

- Whether and to what extent the environment has been degraded or enhanced
- Whether ongoing activities are causing impacts
- What are the trends for activities in and impacts on the area

Projects and activities are evaluated on the basis of the following:

- Proximity
- Connection to the same environmental systems
- Potential for subsequent impacts or activity
- Similar impacts
- The likelihood a project will occur
- Whether the project is reasonably foreseeable

Projects and activities considered in the cumulative analysis were identified through meetings held with cooperators and BLM employees with local knowledge of the area. Each was asked to provide information on the most influential past, present, or reasonably foreseeable future actions. Additional information was obtained through discussions with agency officials and review of publicly available materials and Web sites.

Past actions within the geographic scope are taken into consideration to provide context for the cumulative effects analysis (40 CFR, Part 1508.7). Effects of past actions and activities are manifested in the current condition of the resources, as described in **Chapter 3, Affected Environment**.

Present actions within the geographic scope are also considered (40 CFR, Part 1508.7). Present actions are those that are ongoing at the time of the analysis.

Reasonably foreseeable future actions are those that have been committed to or known proposals that would take place within a 20-year planning period and would be typically reviewed during the 5-year evaluation. Reasonably foreseeable future actions within the geographic scope and the timeframe of the analysis are also considered (40 CFR, Part 1508.7); they are not limited to those that are approved or funded.

Reasonably foreseeable future action scenarios are projections made to predict future impacts; they are not actual planning decisions or resource commitments. Projections, which have been developed for analytical purposes only, are based on current conditions and trends and represent a best professional estimate. Unforeseen changes in such factors as economics, demand, and federal, state, and local laws and policies could result in different outcomes than those projected in this analysis.

A reasonably foreseeable development (RFD) scenario is the basis for analyzing environmental impacts from future leasing and development of mineral resources in a decision area. A variety of factors (e.g., economic, social, and political) are beyond the control of the BLM and will influence the demand for mineral resources. Therefore, an RFD scenario is a best professional estimate of what may occur if BLM-administered lands are leased. It is not intended to be a “maximum-development” scenario; however, it is biased toward the higher end of expected development and shows where the potential development might occur.

Leasing and developing geothermal resources in the Oregon Sub-region are based on the RFD scenario described in **Section 4.2.1, Analytical Assumptions**, of the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (BLM and Forest Service 2008; the RFD scenario was created for a different analysis and not this RMPA/EIS). Additional information on this Final EIS is provided on the BLM website at

http://www.blm.gov/wo/st/en/prog/energy/geothermal/geothermal_nationwide/Documents/Final_PEIS.html.

Excluding geothermal resources, RFD scenarios for minerals and mineral potential reports were not completed for this RMPA/EIS. All future looking estimates are based on broad-scale “trends” review, which is an opinion, as opposed to a methodological approach.

Other potential future actions have been considered and eliminated from further analysis. This was because there is a small likelihood these actions would be pursued and implemented within the life of the plan or because so little is known about the potential action that formulating an analysis of impacts is premature.

In addition, potential future actions protective of the environment (such as new regulations related to fugitive dust emissions) have less likelihood of creating major environmental consequences alone, or in combination with this planning effort.

Such federal actions as species listing would require the BLM to reconsider decisions created from this action because the consultations and relative impacts might no longer be appropriate. These potential future actions may have greater capacity to affect resource uses within the planning area; however, until more information is developed, no reasonable estimation of impacts could be developed.

Data on the precise locations and overall extent of resources within the planning area are considerable, although the information varies according to resource type and locale. Furthermore, understanding of the impacts on and the interplay among these resources is evolving. As knowledge improves, management measures (adaptive or otherwise) would be considered to reduce potential cumulative impacts, in accordance with law, regulations, and applicable RMPs.

Projects and activities identified as having the greatest likelihood to generate potential cumulative impacts when added to the Oregon Greater Sage-Grouse RMPA/EIS alternatives are displayed in **Table 5-23**. In addition, there are ongoing planning efforts both within (e.g., Baker RMP) and adjacent to the sub-region (e.g., Nevada/California Sub-region GRSG LUPA/EIS) with which this planning effort has been coordinated and aligns. The collective actions proposed in these ongoing efforts could result in cumulative effects throughout the Great Basin Region, including on this Oregon Greater Sage-Grouse RMPA/EIS.

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Boardman to Hemingway (B2H) Transmission Line EIS	B2H is an approximately 300-mile 500-kV transmission line proposal.	From Boardman, Oregon, to Melba, Idaho. Multiple population areas, including Morrow, Umatilla, Union, Baker, and Malheur Counties in Oregon and Owyhee and Canyon Counties in Idaho Shoshone-Paiute Tribes of the Duck Valley Indian Reservation, the Confederated Tribes of the Umatilla Indian Reservation, the Shoshone-Bannock, and the Burns Paiute Tribes	Project under NEPA review, estimated ROD in 2016.	Baker and extreme north area of Northern Great Basin
Burns District				
Otis Mountain—Moffit Table Restoration Project	Cut, pile, and burn encroaching western juniper on a landscape scale, encompassing approximately 20,407 acres, to return vegetation communities to historic shrub-steppe and to reduce hazardous fuel loads	Three Rivers Resource Area	Ongoing	Northern Great Basin
Communication sites (e.g., cellular)	Ongoing communication needs for public, private, State of Oregon, Forest Service, BLM, and ROW holders	Harney County, Wrights Point, Wagontire Mountain, Jack Mountain, Buckskin Mountain, Burns Butte, Riddle Mountain, Riley Area, Beatty's Butte, King Mountain, Steens Mountain	Ongoing	Western Great Basin/Northern Great Basin/Central Oregon

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
North Steens Ecosystem Restoration Project	Treat expansion western juniper on a landscape scale, encompassing approximately 336,000 acres CMPA to return vegetation communities to historic compositions and reduce hazardous fuel loads.	Steens Mountain Cooperative Management and Protection Area	Ongoing	Western Great Basin
Lake Creek/Boone Canyon Forest Restoration Project	Thin, pile, and burn expansion juniper and ponderosa pine. Future planning includes an underburn.	Three Rivers Resource Area	Ongoing	Central Oregon
Three Rivers Underburning Project	Prescribed fire to control expansion juniper and ponderosa pine.	Three Rivers Resource Area	Ongoing	Central Oregon/Northern Great Basin
Forks of Poison Creek/Devine Ridge Vegetation Management Restoration:	Prescribed fire to control expansion juniper and ponderosa pine. The burned area was seeded in spring 2011. Ongoing work includes maintaining several aspen fences in the burn area.	Three Rivers Resource Area	Ongoing	Central Oregon/Northern Great Basin
Slick Ear/Claw Creek Forest Restoration Project	The goals of the project are to reduce hazardous fuels, restore plant communities, and improve wildlife habitat diversity. The emphasis on treatments will be in forested areas.	Three Rivers Resource Area	Ongoing	Central Oregon
The SHED Forest Restoration Project	Implementation plans include thinning, piling, pile burning, and implementing a forest underburn.	Three Rivers Resource Area	Ongoing	Northern Great Basin

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Camp Harney/Cow Creek Ecological Restoration Project	Implementation plans include thinning, piling, pile burning, and implementing a forest underburn.	Three Rivers Resource Area	Ongoing	Northern Great Basin
Dry Lake Ecological Restoration Project	Implementation plans include thinning, piling, pile burning, implementing a forest underburn, and, in general, implementing prescribed fires.	Three Rivers Resource Area	Ongoing	Central Oregon
Five Creeks Rangeland Restoration Project	A landscape-scale vegetation treatment encompassing approximately 73,500 acres (approximately 26,000 acres in the CMPA) to return vegetation communities to historic compositions and reduce hazardous fuel loads. Various forms of prescribed fire and mechanical treatments have been used to reduce influence of encroaching western juniper.	Three Rivers and Andrews/Steens Resource Areas	Ongoing	Western Great Basin/ Northern Great Basin
North Steens 230-kV Transmission Line Project	North Steens is a 29-mile 230-kV transmission line that would convey 104 MW of power generated from wind farms proposed on private land on the north side of Steens Mountain.	Project in Harney County on the north side of Steens Mountain	Project approved and ROD signed in December 2011; in litigation.	Western Great Basin/ Northern Great Basin

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
SES Project	Reduce hazardous fuels, restore plant communities, and improve wildlife habitat diversity, with an emphasis on treatments in forested areas	Three Rivers Resource Area	Ongoing	Central Oregon
District-wide invasive plant treatments	Ongoing interagency efforts with Oregon Department of Agriculture and Harney County.	Wide spread across Harney County	Ongoing	Western Great Basin/ Northern Great Basin/Central Oregon
Steens Mountain Comprehensive Recreation Plan	Multiyear plan to manage recreation on Steens Mountain, including maintaining facilities, creating new facilities and trails, closing roads, and providing interpretation.	Steens Mountain Cooperative Management and Protection Area	EA to go out for additional public comment fall/winter 2014/2015; decision expected in spring 2015	Western Great Basin
Wild Horse gathers	Gather wild horses.	District-wide	As funding, space, and national priorities dictate	Western Great Basin/Northern Great Basin/Central Oregon
Holloway ES&R	Rehabilitation following wildland fire.	Trout Creek Mountain, Andrews Resource Area	Some implementation complete.	Western Great Basin
Miller Homestead ES&R	Rehabilitation following wildland fire.	Catlow Valley, Andrews Resource Area	Some implementation complete.	Western Great Basin
Bone Creek Basin Fire ES&R	Rehabilitation following wildland fire	Steens CMPA	Implementation started fall 2014	Western Great Basin

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Greater Sage-Grouse Habitat Improvement Project	Reduce hazardous fuels, restore plant communities, and improve wildlife habitat diversity, with an emphasis on treatments in forested areas	Three Rivers Resource Area	Ongoing	Central Oregon
Alder Creek Restoration	Ecological restoration projects (channel restoration and juniper treatment, each with corresponding invasive plant surveys and treatments) and address the stream channel instability and encroached juniper in 7,187 acres	Three Rivers Resource Area	EA expected out to the public in fall/winter of 2014/2015	Northern Great Basin
Upton Mountain Allotment Management Plan	Control medusahead, rye, and cheatgrass with herbicides and targeted grazing on 13,714 acres; increase fire return intervals and restoration of sagebrush steppe	Three Rivers Resource Area	EA expected out to the public in fall/winter of 2014/2015	Northern Great Basin
Warm Springs Irrigation District FERC Project and Right-of-Way	Warm Springs Dam converted to generate energy in addition to providing irrigation	Burns District and Vale District	FERC lead for NEPA; EA expected in 2015	Northern Great Basin
District-wide Vegetation Management (Invasive Plant EA)	Use new chemicals to treat noxious and invasive plants.	Wide Spread Across Harney County	EA in process.	Western Great Basin/Northern Great Basin/Central Oregon
Geothermal testing	Drill test wells for geothermal exploration	Glass Buttes, Burns District, and Prineville District	Implementation August 2014	Central Oregon

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Wagon Tire Wind Energy Testing Project	Testing for a wind farm	Three Rivers Resource Area	Development application withdrawn; new applicant; application in process	Western Great Basin/Central Oregon
Lakeview District				
Locatable mining	Two areas in the Lakeview RA, where locatable minerals mining is ongoing; both will continue or expand in the near future; Tucker Hill and Rabbit Basin Sunstone areas	Lake, Oregon	Ongoing	Western Great Basin
	Tucker Hill, active 47-acres perlite mine, authorized to expand to 75 acres; additional 100-acre proposed expansion area		Under initial study	
	Rabbit Basin Sunstone area; approximately 43 open notices and plans of operations for sunstone mines, affecting about 75 acres centralized in a 5,000-acre area		Ongoing	
	Three to five new notices received or plans of operations approved each year, for up to 25 acres of additional disturbance each year		Estimated expansion	

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Pacific Direct Intertie Upgrade and Maintenance	Maintain and upgrade the existing Bonneville Power Administration power line from Columbia River south to the northern Nevada border.	Deschutes and Lake, Oregon	Implementation 2014-2016	Western Great Basin and Central Oregon
South Warner Sagebrush Sage-Grouse Habitat Restoration	Juniper removal from a 50,000-acre South Warner Rim project area adjacent to the Ruby pipeline. Following completion, a 5-10 year maintenance plan will need to be implemented to maintain habitat conditions; burned piles would be seeded	Lake, Oregon	Multi-year implementation 2012-2022 FIAT planning in progress	Western Great Basin
Prescribed burning—Green Mountain, Hayes Butte, Bridge Creek, and Highway 31 project areas	Burning of individual juniper trees in sagebrush habitat to improve sagebrush/sage-grouse habitat up to 1,100 acres.	Lake, Oregon	2013	Central Oregon
Silver Creek juniper cutting	Cutting juniper in sagebrush habitat to improve sagebrush/ sage-grouse habitat (1,000 acres).	Lake, Oregon	2013	Central Oregon
Brown's Valley and Paisley Desert fuel break maintenance mowing	Mowing existing fuel breaks next to roads to prevent large-scale wildfires in sagebrush habitat	Lake, Oregon	2014-2015	Central Oregon
Wild horse gathers	Gather wild horses	Lake and Harney Counties, Oregon	As funding, space, and national priorities dictate	Central Oregon
District-wide vegetation management (invasive plant EA)	Use new chemicals to treat noxious and invasive plants on about 5,000 acres each year.	Lake and Harney Counties, Oregon	10-15 year implementation	Central Oregon

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Orejana West Sagebrush Sage-Grouse Habitat Restoration	Fuel breaks have been mowed in the recent past along all of the major roads in the project planning area. Conifer encroachment is not a major concern. The main management activities would be focused on maintaining the mowed fuel breaks.	Lake County, Oregon	FIAT planning in progress	Western Great Basin
North Warner Sagebrush Sage-Grouse Habitat Restoration	Currently invasive species surveys are taking place across the entire North Warner PPA, with high priority being nonnative, invasive annual grasses. The goal of this survey is to develop a containment/management plan for the existing invasive species. Treatments will consist of herbicide application, followed by restoration if needed. Canada thistle has become an issue in many of the riparian areas and springs in the PPA.	Lake County, Oregon	FIAT planning in progress	Western Great Basin
Gravelly Sagebrush Sage-Grouse Habitat Restoration	The Gravelly PPA has a high population of GRSG and good connectivity to adjacent areas. Threats to this PPA are juniper encroachment and cheatgrass.	Lake County, Oregon	FIAT planning in progress	Western Great Basin
Clover Flat Sagebrush Sage-Grouse Habitat Restoration	The GRSG population in this PPA is isolated, with apparently poor connectivity and high risk of	Lake County, Oregon	FIAT planning in progress	Western Great Basin

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
	extirpation. There are large pockets of invasive annual grasses in this area. Existing juniper and encroachment is a concern for fire and habitat loss.			
Beaty Butte Sagebrush Sage-Grouse Habitat Restoration	Invasive plants in the project planning area have been managed through the Lakeview Resource Area Integrated Invasive Plant Management Plan; however, no effective herbicide was available to control annual grass species, so they have not been managed in the PPA. New herbicides have recently become available to assist in managing the nonnative invasive winter annual grass species, and thousands of acres could be improved within GRSG habitat by removing these grasses.	Lake County, Oregon	FIAT planning in progress	Western Great Basin
Lakeview RMP Amendment	Limited RMP Amendment	Lakeview BLM Field Offices	Awaiting GRSG FEIS completion	Western Great Basin, portion of Central Oregon
Prineville District				
West Butte Wind Power	The West Butte project includes a permanent 4.5-mile access road, a pole-mounted 115-kV electrical transmission line, and a 14.4-kV electrical utility line that would convey 104 MW of power	32 miles east of Bend, Oregon	NEPA and ROD completed 2011; implementation date unknown.	Central Oregon

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
	generated from 52 wind turbines proposed on private land.			
Playa Restoration Project	Cut up to 2,000 acres of juniper per year; close about 10 miles of road in playas; restore playa habitat by filling in dugouts and excluding livestock access; effects on GRSG and other wildlife	South of Hampton, Oregon	NEPA and DR completed 2014; implementation ongoing through 2034	Central Oregon
High Desert Shrub Steppe Project	Cut or burn up to 10,000 acres of juniper per year; effects on GRSG	Between Millican and Hampton, Oregon	NEPA and ROD completed 2011; implementation ongoing through 2031	Central Oregon
District-wide invasive plant management	Treat invasive plants; effects on a variety of resources	Entire Prineville District	NEPA analysis in progress; expect DR in 2015 and implementation 2015 through 2034	Central Oregon
Glass Buttes communication site	Communication site upgrades on about 5 acres and RMP amendment for visual resources (VRM Class II to VRM Class IV) on about 45 acres; effects on visual resources and public safety	Near Hampton, Oregon	NEPA analysis in progress; DR expected 2015 and implementation beginning in 2016	Central Oregon
Multiple grazing permit renewals	Renew 37 grazing permits and leases and change grazing season or install such facilities as fencing and water troughs, or do both; effects on local economy and wildlife	Various areas in Prineville District	NEPA analysis in progress; expect DR early 2016	Central Oregon

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
McGrath land sale	Allow direct sale of 80 acres	20 miles southeast of Prineville	NEPA analysis in progress; DR expected fall 2015	Central Oregon
Electrical line ROW renewal/issuance	Issue new ROWs (or renew those already in place) to allow operation and maintenance for the next 30 years on 114 miles of aerial transmission or distribution lines and 138 miles of access roads	Hampton area	NEPA analysis in progress; decision expected 2015	Central Oregon
Vale District				
Baker Habitat Restoration and Fuels Treatment projects	Multiyear phased hazardous fuels and wildlife habitat restoration project on approximately 45,000 acres.	Baker County, 7 to 25 air miles southwest of Baker City	ROD and FONSI signed; EA distributed/ public comment received	Baker population and Northern Great Basin Core population
District-wide invasive plant treatments	Ongoing interagency effort with Oregon Department of Agriculture and eastern Oregon counties.	Vale District counties in Oregon and Washington	Continuing.	Baker population and Northern Great Basin Core population
Mormon Basin Fuels Treatment	Largely juniper reduction. Focus is on "C" allotments in northern Malheur County, in coordination with OWEB funding and ODFW habitat management projects.	Northwest Malheur County	EA public scoping period closed; projected signature expected spring 2015	Northern Great Basin Core population
High Bar/Upper and Lower Pine Creek Placer Mining Project	Up to 250 acres of activity would be disturbed for mineral extraction.	Baker County, near the town of Hereford, Oregon	ROD signed.	Northern Great Basin PGH population
Malheur Queen Placer	Approximately 800 acres approved for development of placer gold extraction.	Malheur and Baker Counties (specifically, North-central Malheur County)	ROD and FONSI signed; development underway.	Northern Great Basin Core population

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Advance Testing for Natural Gas	Proponent is developing planning to test for natural gas.	Northern Malheur County	Only notice of testing locations provided. The BLM has met in the field with proponent. Note that significant effort is underway across the state line in Idaho investigating natural gas.	Northern Great Basin Core population
Grassy Mountain Gold	Expansion of gold mine on private lands. Access crosses BLM-administered lands.	Northern Malheur County	Plans are anticipated at an unknown date. The proponent is completing baseline studies to fulfill state permits. Current activity is on private lands. Several coordination meetings have already been held.	Northern Great Basin Core population
Aurora Project	Uranium extraction proposed. Project area within historic mercury mine area.	South-central Malheur County, along Nevada border. Transport of material and supplies would likely be from Oregon south into Nevada. Mid-scale area effected at the	Initial coordination with proponent; site has been tested for development potential.	Northern Great Basin Core population

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
		socioeconomic level (Nevada, Idaho, and Oregon); project disturbance projected to be localized		
Wild horse gathers	Gather wild horses	District-wide	As funding, space, and national priorities dictate	Baker population and Northern Great Basin population
Poorman-Balm Creek CERCLA Mine Site Remediation	Continued remediation and removal of contaminated soils and mine waste at the abandoned Poorman-Balm Creek Mine. Project area has 56 disturbed acres.	Baker County, 20 miles northeast of Baker City	Ongoing since 2003; estimated completion date October 2014	Baker population
Paul Ada and Snappy Ben	Mining project that would allow disturbance of 15 acres in PGH	Baker County	EA is expected to be released fiscal year 2014	Baker population
Powder River Canyon Geographic Unit Permit Renewal	Livestock grazing permit renewal, making a slight modification to livestock management that will improve 2 acres of riparian area located PPH	Baker County	EA is expected to be released early fiscal year 2015	Baker population
Northwest Malheur Fuels	Fuels reduction and restoration	Northwest Malheur County	EA under development through contract	Northern Great Basin

Table 5-23
Reasonably Foreseeable Future Actions

Oregon Sub-Region Sage-Grouse Land Use Plan Amendments Reasonably Foreseeable Future Actions				
Name	Description	Location	Status of Action	GRSG Population
Tri-State Fuels	Fuels reduction and suppression planning	Southeast Malheur County	EIS under development, in concert with Idaho BLM; project area includes lands in Vale and Boise BLM Districts	Northern Great Basin
Annual, small-enterprise mining EA, Baker County, Oregon, Baker Field Office, BLM	Commitment is to process one EA annually for existing plans of operation proposals	Southwest Baker County	EA in development; anticipated decision late fiscal year 2015/early fiscal year 2016	Northern Great Basin
Baker RMP	RMP Amendment	Baker BLM Field Office	Awaiting GRSG FEIS completion	Baker population
Southeastern Oregon RMP Amendment	Limited RMP amendment	Malheur and Jordan BLM Field Offices	Awaiting GRSG FEIS completion	Northern Great Basin and small sections of Western Great Basin

5.6 VEGETATION

The cumulative impact analysis area used to analyze cumulative impacts on vegetation covers the planning area. The indicators used are the same as those used for direct and indirect impacts to vegetation in **Chapter 4**.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect vegetation are vegetation and habitat management and improvement projects, invasive plant control, wildland fire management, livestock grazing management, wild horse and burro use and gathers, mining, and renewable energy development.

Climate change increases the uncertainty that the BLM can achieve the desired outcomes from vegetation management in any alternative. Although the number of studies is increasing, the potential impacts of climate change in sagebrush steppe and on GRSG persistence remains very uncertain. Climate change is likely to alter habitat conditions for GRSG in ways that the BLM cannot mitigate, although the timing of when such changes would occur is not known. Most studies of potential climate change impacts indicate that changes are not likely until a disturbance occurs due to inertia in the ecosystem (Peterson et al. 2014). Further, climate scientists expect that changing disturbance regimes, such as fire and drought, and increased competition for water and carbon will likely result in more rapid change than through changes in temperature and precipitation alone (Allen et al. 2010; Clark et al. 2014; Peterson et al. 2014).

Alternative A

Current management would continue on BLM-administered lands in the planning area. There would be no PHMA or GHMA designated. Most land use plans, particularly the older plans for Brothers/La Pine and Three Rivers, would not implement use restrictions (e.g., ROW exclusion and closure to mineral leasing and development) to protect GRSG habitat. Grazing management would not specifically consider GRSG habitat needs, and vegetation management would not prioritize sagebrush. Newer plans (e.g., Southeast Oregon, Lakeview, Steens, Andrews, and Upper Deschutes) may prescribe guidance for some of these resources and uses, but with no or little consistency across the decision area.

Planned ROW construction could increase fragmentation of vegetation, and any new energy developments would increase loss of sagebrush vegetation. However, some use restrictions would be implemented, which would protect vegetation in these areas from degradation or removal. Vegetation management and invasive plant control projects would benefit sagebrush ecosystems by removing invasive plants and promoting healthy vegetation communities. Overall, Alternative A would lack the landscape-level management tools to reduce cumulative effects from past, present, and reasonably foreseeable future actions.

Alternative B

Under Alternative B, PHMA and GHMA would be designated and use restrictions would be implemented in these areas. For example, ROW exclusion and avoidance areas would be established within PHMA and GHMA, respectively, and these would cover larger areas than under Alternative A. Grazing management would be changed to reduce impacts on sagebrush vegetation. No ACECs would be established.

Most ROWs, access roads, and associated infrastructure planned according to **Table 5-23** would be sited outside PHMA under Alternative B. The exception would be locatable minerals proposed for withdrawal, planned mineral and geothermal exploration and development sited outside PHMA in unleased areas, and conservation measures applied to valid existing rights.

The vegetation management and restoration projects mentioned above would benefit the planning area in discrete locations. As a result, the adverse cumulative effects from past, present, and reasonably foreseeable future actions under Alternative B would be reduced, compared to Alternative A.

Alternative C

Removing grazing would likely reduce potential impacts from grazing described in **Section 4.4**. Cumulative impacts associated with grazing would also be reduced. All PHMA would be managed as an ACEC. Use restrictions in these areas would retain the extent and condition of native vegetation, thereby reducing adverse cumulative impacts from resource uses. Other cumulative impacts are similar to those described for Alternative A.

Alternative D

Alternative D is intended to preserve management flexibility and provide increased implementation guidance while protecting GRSG habitat. Management under Alternative D would increase vegetation protection compared to current management, but with less protection than Alternatives B or F.

Alternative D would establish ROW avoidance but not exclusion areas, thereby reducing but not eliminating impacts from ROW development. PHMA would also be ROW avoidance for wind and solar energy development. Restrictions on mineral leasing and development would be greater than under Alternative A, but less stringent than Alternatives B, C, and F. Prescribed burning and fuels management would take sagebrush vegetation into account.

As under the other alternatives, the vegetation management and invasive plant control plans listed in **Table 5-23** would benefit vegetation health. Development restrictions in occupied habitat would retain existing vegetation, and rangeland improvements would improve vegetation quality on sagebrush acreage. As a result, the adverse cumulative effects from past, present, and reasonably foreseeable future actions under Alternative D would be reduced,

compared to Alternative A, but to a lesser extent than under Alternatives B and C.

Alternative E

Adverse cumulative impacts from Alternative E are similar to those described for Alternative D.

Alternative F

Alternative F would provide more protection to GRSG habitat on BLM-administered land but would reduce management flexibility. Alternative F would establish ACECs in occupied habitat, and occupied habitat would be ROW exclusion areas and closed to mineral development and leasing. PHMA would be proposed for withdrawal from locatable mineral entry. These provisions would protect vegetation from loss, fragmentation, and disturbance associated with surface-disturbing activities.

Reduced grazing would likely reduce potential adverse impacts from grazing described in **Section 4.4**. Reduced management flexibility could lead to inefficient or ineffective management at the site-specific scale when conditions may require alterations in management. As under the other alternatives, the vegetation management and invasive plant management projects listed in **Table 5-23** would benefit vegetation health. Alternative F would impose the most stringent restrictions on development of GRSG habitat, potentially restricting the ROW and mineral developments in **Table 5-23**, thereby retaining the greatest extent of sagebrush vegetation. As a result, Alternative F would result in the greatest reduction in adverse cumulative effects from past, present, and reasonably foreseeable future actions, compared to all alternatives.

Proposed Plan

Cumulative impacts from the Proposed Plan are similar to those described for Alternative D, though under the Proposed Plan the BLM would manage all SFA and PHMA (except in Lake, Harney, and Malheur Counties) as ROW exclusion areas, thereby reducing impacts on vegetation from this type of development. In Lake, Harney, and Malheur Counties, PHMA would be managed as ROW avoidance areas, having the same impacts as Alternative D.

5.7 FISH AND WILDLIFE

The entire planning area was used in the analysis of cumulative impacts on special status wildlife species. Many past and present actions and conditions within the cumulative impact analysis area have affected and will likely continue to affect special status wildlife species (excluding federally listed or proposed species), as described in **Section 4.5**.

There are many habitat improvement projects scheduled for the planning area in the form of invasive plant treatments, conifer encroachment control, wildland fire management, and sagebrush habitat restoration. These improvement efforts would expand the extent and increase the quality of habitat for many special

status wildlife species. These gains however, could be reduced by impacts from transmission line development, alternative energy projects (wind power and geothermal), livestock grazing, and mining (see **Table 5-23**).

Alternatives Analysis

Three indicators were identified to analyze the effects on special status species under each alternative in **Section 4.5**. These indicators include the amount and condition of available habitat, the likelihood of mortality, injury, or direct disturbance, and the likelihood of habitat disturbance.

Management under Alternative A would have the greatest adverse cumulative impacts on special status wildlife species (excluding federally listed or proposed species) because it provides the fewest considerations of ecological impacts in management decisions. Alternatives B, C, D, F and the Proposed Plan would designate 4.5 million acres of PHMA and 5.6 million acres of GHMA. These action alternatives would reduce adverse cumulative impacts on special status wildlife species, compared to Alternative A.

Alternative E would designate 4.5 million acres of Core Area and 3.9 million acres of Low Density habitat. In total, this would provide less protection from adverse cumulative impacts for special status wildlife species, compared to the other action alternatives. Under Alternative C, all occupied habitat would be closed to grazing. This would likely increase fragmentation of special status wildlife habitat as a result of increased fencing and would increase the threat of wildfire due to increased fuel loading in ungrazed habitat. Wildland fire and livestock grazing management under Alternative D and the Proposed Plan would provide comprehensive protection for special status wildlife habitat. Lands and realty actions under the Proposed Plan would retain PHMA and GHMA in public ownership unless lands disposal would have a net conservation gain for GRSG. However, lands and realty management actions under Alternative D would not be as protective of adverse cumulative impacts, compared to the other alternatives.

Under Alternative D, ROW avoidance areas would be established but no ROW exclusion areas. This would allow for development to continue in PHMA. In contrast, PHMA would be an exclusion area for wind and solar ROWs in most of the planning area, and PHMA and GHMA would be avoidance areas for high-voltage transmission lines and major pipelines.

Livestock grazing management under Alternative F would close 25 percent of PHMA and GHMA to livestock grazing. This would reduce impacts from grazing on special status wildlife, including the potential for habitat fragmentation from fencing, compared to Alternative C. Therefore, Alternative F would provide the most protection for special status wildlife species that overlap with GRSG habitat. It would result in the fewest adverse cumulative impacts among the action alternatives.

5.8 WILD HORSES AND BURROS

The cumulative impact analysis area used to analyze cumulative impacts on wild horses and burros management includes the planning area. This is because impacts are expected to be limited to those actions originating within the planning area.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect wild horses and burros management are actions that change forage and water availability, access to water sources, range conditions, barriers to movement and population control (such as removing excess animals and repressing population).

Reasonably foreseeable projects in the project area include extensive vegetation treatment and fuels reduction projects. These could result in short-term impacts on horses and burros, but they are likely to improve rangeland health in the long term. Gathers would continue in the area to keep wild horses and burros at appropriate population levels and to support maintenance or improvement of land health in the area overall. In the event that periodic removals do not occur, horse populations may be impacted by limitation on gathers; the period between gathers is influenced by limitations in short- and long-term holding facilities, adoptions, and other HMAs outside of Oregon, where emergency situations may mandate adjustments in gather schedules. Rangeland health standards may not be met if periodic gathers are not conducted to maintain AML. In addition, actions that indirectly disturb wild horses and burros are recreation and development for transmission, as well as the exploration for energy and mineral development.

Under all alternatives, no direct change would occur to areas allocated as HMAs for wild horses and burros. Under Alternative A, AML would continue to be adjusted as needed, based on rangeland conditions. Populations would be controlled to support land health within the constraints of national priorities and budgets. Under Alternatives B, C, D, E, and the Proposed Plan, there could be long-term reduction of AMLs. This would come about if management for wild horses and burros conflicts with GRSG management objectives, resulting in a cumulative addition to the management needs and associated costs of wild horse and burro management in the planning area. Under Alternative F, a direct 25 percent reduction in AMLs is proposed. This would result in a cumulative addition to costs and time for management of the wild horse and burro program, due to the need for increased gathers. This could strain available resources in the region.

Under the Proposed Plan, prioritization of gathers in HMAs would directly and indirectly impact wild horses and burros in the entire planning area. The following HMAs fall within SFA: Beaty's Butte, Coyote Lake-Alvord-Tule Springs, and Jackies Butte. These HMAs would have the highest standing priority for

gathers each year to retain AML. This focused management strategy would ensure that AML is maintained, along with the necessary forage for the horses in these HMAs; however, it may increase the number of gathers needed and other intensive management to maintain AML, thereby reducing staff time for other lower prioritized HMAs. Prioritization could also put HMAs that fall within the lowest priority and outside GRSG habitat at risk for overpopulation; however, under this LUPA, provisions would allow for exceptions as needed for herd health-limiting impacts.

In addition, should management resources be concentrated in GRSG habitat due to priorities for management under the action alternatives, HMAs outside of GRSG habitat may be allotted fewer resources. In general, actions to improve land health for GRSG are also likely to improve rangelands for wild horses and burros, resulting in a cumulative improvement in the ability to meet AMLs.

5.9 WILDLAND FIRE MANAGEMENT

The area used to analyze adverse cumulative impacts on wildland fire management is the planning area.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect wildland fire management are vegetation management, restoration projects, invasive species and invasive plant control, livestock grazing, wildland fire management, lands and realty, recreation, travel management, mining, and energy development. These actions can modify vegetation condition or FRCC, the likelihood of human-caused wildfire, the size, extent, or occurrence of wildfire, or the response to wildfire.

Alternative A

Under Alternative A, current management would continue on BLM-administered lands in the planning area. There would be no PHMA or GHMA designated; most land use plans would not implement use restrictions (e.g., ROW exclusion and closure to mineral leasing and development) to protect GRSG habitat. Existing plans do not prioritize GRSG habitat in vegetation or grazing management and wildfire response; however, other directives do prioritize GRSG habitat for these programs. Planned ROW construction and new minerals or energy developments could introduce invasive plants and remove beneficial vegetation.

Though these projects would provide for fuel breaks, water sources, and fire response access, developments could result in continued risk of human-induced fire and the need for fire response. Planned restoration projects would focus on overall land health and could lead to improved conditions for wildfire response; however, there is not as much restoration focus as under other alternatives. Alternative A does not provide a focus on GRSG habitat for restoration that would reduce wildfire risks and potential wildfire effects, so it does the least for addressing the wildfire threat to GRSG.

Alternative B

Under Alternative B, the BLM would manage lands to conserve, enhance, and restore sagebrush ecosystems. Direct protection of sagebrush habitat to support GRSG would limit or modify uses. This would improve the acreage and condition of native vegetation communities, which would retain or improve conditions for wildfire management within these areas.

Yet, restrictions could also limit wildfire response and result in higher fuel loads and larger or more severe fires. The vegetation management and restoration projects described in **Table 5-23** would benefit wildfire management in the planning area in discrete locations. As a result, the adverse cumulative effects from past, present, and reasonably foreseeable actions under Alternative B would be reduced, compared to Alternative A.

Alternative C

Management under Alternative C would focus on removing livestock grazing and designating ACECs. Designating PHMA and GHMA and restricting mineral and land use would be similar to that described in Alternative B. However, there would be fewer acres open to fluid minerals leasing, fewer mineral materials sales, and fewer nonenergy leasables than under Alternative B. Management would focus on removing livestock grazing from GRSG habitats, with other management similar to Alternative A. Planned ROW construction and mineral and energy development projects may increase the number of human-caused wildfire starts during active operations, although various stipulations usually require that operators provide some capability for initial attack. Adverse cumulative impacts on wildfire management from designating PHMA and GHMA and restricting mineral and land use would have the same impacts as described for Alternative B. Other impacts are similar to Alternative A.

Alternative D

Under Alternative D, the BLM would manage lands to maintain or enhance GRSG habitat to establish a mix of sagebrush classes. Although impacts are similar to Alternative B, Alternative D provides priorities for wildfire, fuels, sagebrush, and juniper treatments through the plan direction and through the FIAT assessments (see **Appendix H**, Fire and Invasives Assessment Tool). Focal areas for management actions are prioritized by overlaying matrix components with sage-grouse PACs, breeding bird densities, and specific habitat threats. Decision tools are included to help determine the most appropriate management treatments for each of the focal areas that are identified.

The management of land uses, locatable minerals, fluid mineral leasing, and nonenergy leasables would be similar to Alternative A; , mineral material sales, and travel would be the same as Alternative B.

Alternative D would have beneficial impacts on wildland fire management because it would emphasize restoration of native vegetation and fuels

treatments as well as prioritize projects for the protection of sagebrush habitat. The planned vegetation management and restoration projects described in **Table 5-23** would further benefit wildfire management in the planning area. As a result, the adverse cumulative effects from past, present, and reasonably foreseeable actions under Alternative D would be reduced, compared to Alternative A.

Alternative E

Conservation guidelines under Alternative E are designed to maintain or enhance the quality of current habitats; however, the overall management and impacts are similar to Alternative B. The greatest difference is the approach to livestock grazing. As a result, the adverse cumulative effects from past, present, and reasonably foreseeable actions under Alternative E would be reduced, compared to Alternative A, but to a lesser extent than Alternative D.

Alternative F

Management under Alternative F would be largely similar to that described for Alternative B, though with more stringent guidance and restrictive management in sagebrush ecosystems. More acres would be closed to grazing than under Alternative B. Impacts from Alternative F are similar to those described for Alternative B; however, Alternative F could improve conditions for wildfire management compared to Alternative B. the adverse cumulative effects from past, present, and reasonably foreseeable actions under Alternative F would be reduced, compared to Alternatives A and B, but to a lesser extent than Alternative D.

Proposed Plan

Management under the Proposed Plan would be similar to that described for Alternative D; however, prescribed fire could be used in GRSG habitat under certain circumstances. The Proposed Plan requires an assessment of management needs based on local conditions, as detailed in **Appendix H**, Fire and Invasives Assessment Tool. A comprehensive strategy for fuels management would be implemented under the Proposed Plan, including the GRSG Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment. These actions would improve wildfire management and would reduce the likelihood for high severity wildfire. The planned vegetation management and restoration projects described in **Table 5-23** would further benefit wildfire management in the planning area. As a result, the adverse cumulative effects from past, present, and reasonably foreseeable actions under the Proposed Plan would be reduced, compared to Alternative A and all other alternatives.

5.10 LIVESTOCK GRAZING/RANGE MANAGEMENT

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect livestock grazing include those that reduce available grazing acreage or the

level of forage production in those areas or that inhibit livestock improvements, such as water development or fences.

In the planning area, relevant past and present actions include human-caused surface disturbances, such as those associated with minerals, transmission and energy development, recreation, and current and historic grazing practices. In addition, changes in habitat have occurred due to historic fire suppression which has impacted forage levels. In addition, in many locations, junipers and trees are encroaching into grasslands, thereby decreasing available forage.

Reasonably foreseeable future actions affecting livestock grazing are similar to present actions. They include ongoing permit and lease renewals and range improvement projects, as detailed in **Table 5-23**. These actions could cumulatively reduce permitted AUMs or restrict management options. This would be the case if allotments were found to be inconsistent with land health standards due to livestock use.

Cumulative projects that increase human disturbance in grazing areas could also indirectly impact grazing by increasing the spread or dominance of invasive plant species. As stated above, invasive plant invasion can reduce preferred livestock and wildlife forage and can increase the chance of invasive plants being dispersed by roaming cattle. Cumulative projects that increase human disturbance in grazing areas could also directly impact grazing by displacing, injuring, or killing animals. Such projects include potential access roads, transmission line development, and some minimal geothermal exploration and mineral development.

Conversely, extensive planned vegetation improvement, invasive plant removal, and fuels reduction and restoration in the planning area could exclude grazing from site-specific areas temporarily. However, these activities would generally improve rangeland conditions in the long term by reducing the encroachment of juniper into grasslands and improving vegetation condition. In addition to foreseeable actions, vegetation could change with continued drought or climate change. These changes are difficult to quantify. Little is known about the potential rates of change for vegetation associated with climate change. Overall drier conditions would likely reduce average annual grass production, while changes in the drought regime would likely increase the variability in grass production.

The contribution of the project to cumulative impacts parallels the impacts of the alternatives, as described in **Section 4.8**.

Alternative A

Under Alternative A, permitted active use would likely decline to some extent over time, following observed trends. Alternative A would allow the highest level of surface disturbance of all alternatives. The highest cumulative effect would be decreasing forage availability in the planning area.

Alternative B

Under Alternative B, while permitted AUMs would not be directly reduced, as compared to Alternative A, permitted active use would decline to a greater extent over time. This would be due to the implementation of grazing management changes to meet GRSG habitat objectives. These objectives include potential grazing management changes and restrictions on structural improvements and water developments. As a result, forage availability may increase in GRSG habitat, although this forage would generally not be available for livestock use. Surface-disturbing activities would be sited in lower priority habitat areas and mainly in nonhabitat areas. This would increase cumulative impacts in these areas.

Alternative C

The greatest impacts on livestock grazing in the planning area would be seen in Alternative C, due to the elimination of all AUMs within occupied habitat. The elimination of grazing in occupied habitat could reduce overall livestock grazing, both inside and outside the planning area. Many livestock operations that rely on BLM-administered lands also incorporate private and leased lands in their operations. Private and leased grazing lands are often limited and may not be able to absorb the grazing use that is eliminated from BLM-administered lands.

Elimination of grazing in occupied habitat would likely result in operations going out of business. In other cases, greater reliance on private lands could also put additional pressure on forage resources. It also could accelerate the conversion of private native range at a local level, potentially including GRSG habitat, to agricultural or introduced grass production.

Alternative D

Cumulative impacts under Alternative D are similar to those described under Alternative B. In addition permitted use would be reduced within specific key RNAs (acres open to grazing would be reduced approximately 1 percent in GRSG habitat and permitted use [AUMs] would be reduced approximately 1 percent). However, there would be some increased flexibility for restricting land use. As a result, increasing forage level in GRSG habitat and shifting grazing to non-GRSG habitat may be moderated, along with economic impacts on area permittees.

Alternative E

Under Alternative E, management direction would decrease disturbance focused in areas near seasonally important GRSG habitat and leks. As a result, forage in these areas and disturbance in other areas may increase.

Alternative F

Under Alternative F, permitted grazing would be reduced. Areas open to grazing would be reduced by approximately 25 percent, and permitted AUMs would be reduced approximately 62.5 percent in GRSG habitat. As discussed for Alternative C, the reduction of grazing in occupied habitat could reduce

overall livestock grazing, both inside and outside the planning area. This also may have economic impacts on local permittees and lessees. In addition, prohibiting structural range improvements and new water developments under Alternative F would further decrease grazing for both BLM lands and the area overall. This would increase forage availability but could lead to closures or reductions in grazing should operators go out of business.

Proposed Plan

Cumulative impacts under the Proposed Plan would be similar to Alternatives B and D. In addition, under the Proposed Plan, permitted use would be reduced within specific key RNA areas (acres open to grazing would be reduced by less than .5 percent in GRSG habitat, and permitted use [AUMs] would be reduced by less than .5 percent). This may have economic impacts on local permittees and lessees.

Prioritization of land health assessment and monitoring in areas not currently meeting land health standards would likely improve vegetation conditions overall in the planning area. As discussed under Alternative B, forage availability may increase in GRSG habitat, although this forage would generally not be available for livestock use.

A limitation on structural range improvements would further increase costs for grazing on federal lands. This would increase forage availability but could reduce grazing if operators go out of business.

5.11 RECREATION

The cumulative impact analysis area used to analyze cumulative impacts on recreation is the planning area and all big game herd units that intersect the planning area. Any activities that affect game populations would in turn impact wildlife viewing and hunting because of the loss or gain of the number of animals. The cumulative impact analysis area also extends along major roads, trails, and rivers, where management inside the planning area could impact use outside of it.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area have affected and will likely continue to affect recreation surrounding BLM and Forest Service management plans and increased visitation (especially from residents in the planning area and those from the surrounding region). Actions identified in **Table 5-23** that change recreation settings through development or cause the route network to become more congested will also affect recreation. These actions are usually related to energy development or transmission. Overall, these actions are not expected to influence cumulative impacts because of the large remote character of much of the cumulative impact analysis area.

The proposed Steens Mountain Comprehensive Recreation Plan would improve recreational opportunities and experiences in the Steens Mountain Cooperative

Management and Protection Area by maintaining facilities, creating new facilities and trails, closing roads, and providing interpretation. Impacts would only occur in and adjacent to the Steens Mountain Cooperative Management and Protection Area.

Alternatives Analysis

Under Alternatives A and C, existing recreation opportunities would be maintained. Fuels treatments and road and trail infrastructure upgrades are expected to benefit recreation by improving the recreational setting and opportunities.

Under Alternative B, limits on road construction in PHMA would reduce new opportunities for motorized recreation in the long term. This could result in localized congestion and user conflicts if motorized travel were to increase in popularity. Eliminating all cross-country motorized travel would result in a cumulative loss of cross-country recreation opportunities. Some users would go elsewhere to seek these opportunities, but there are few lands within the analysis area open to cross-country use.

Under Alternative D, adding stipulations to SRPs to protect GRSG and their habitat could force permittees to move their businesses and events onto lands not administered by the BLM in the planning area. This is not expected to result in a loss of recreation opportunities because organized recreation would be shifted to new locations or times of the year.

Cumulative impacts under Alternative E are similar to those under Alternative D. Conservation measures and relocation requirements for SRPs would result in seasonal and locational shifts in organized recreation, but they are not expected to result in large-scale loss of recreation opportunities.

Impacts under Alternative F are the same as those described under Alternative B.

Impacts under the Proposed Plan would be similar to those under Alternative B, except that there would be greater restrictions on recreation, facilities, and permits in PHMA and GHMA. This could result in localized congestion and conflicts if users were displaced into smaller segments of the planning area.

5.12 TRAVEL MANAGEMENT

The cumulative impact analysis area used to analyze cumulative impacts on travel management includes the planning area and extends along major roads and trails where management inside the planning area could impact use outside it.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect travel management are increased use of the travel system and any new

actions that introduce additional traffic or reduce or expand the travel system. Actions identified in **Table 5-23** that would impact travel management are travel system maintenance, energy development, and expansion of the WUI. Overall, these actions are not expected to influence cumulative impacts because of the large remote character in much of the cumulative impact analysis area. Impacts would be localized, occurring in the vicinity of these new actions and near population centers.

Alternative A

Under Alternative A, existing travel opportunities would be maintained, and the existing travel network would continue to meet the public's needs.

Alternative B

Eliminating all cross-country motorized travel would result in a cumulative loss of cross-country travel opportunities. Some users would go elsewhere for cross-country travel opportunities, but there are few lands within the analysis area open to cross-country use. Other cross-country travel systems may be less capable of accommodating extensive cross-country use; the multijurisdictional travel system encompassing the analysis area may be unable to accommodate demand.

Alternative C

Impacts are the same as those under Alternative A.

Alternative D

Impacts are the same as those under Alternative B.

Alternative E

Restricting motorized use near leks during breeding season (approximately March 1 through July 15) would seasonally limit access in certain parts of the decision area. It could cause travel to be shifted onto private or state lands in the planning area during breeding season.

Alternative F

Prohibiting new road construction and road upgrades in occupied GRSG habitat could result in localized congestion and user conflicts if motorized travel were to increase in popularity. This could cause travel to shift onto private or state lands and the potential for increased impacts on travel management if those travel systems were ill-equipped for an increase in use.

Proposed Plan

Impacts would be similar to those under Alternative B. The exception is that, with additional restrictions on route construction and realignment and upgrades to primitive roads, the BLM would have less flexibility to respond to any localized congestion and user conflicts if motorized travel were to increase in popularity. This may displace use onto other lands in the analysis area, though the multijurisdictional travel system is well dispersed and would likely

accommodate any additional use on non-BLM routes. This is as opposed to cross-country travel, which would be eliminated in the decision area and may cause overcrowding in other areas open to cross-country travel.

5.13 LANDS AND REALTY

The cumulative impact analysis area used to analyze cumulative impacts on lands and realty includes all lands within the planning area boundary.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect lands and realty are land use authorizations. Past authorizations include those for linear features, such as roads, power lines, and the Ruby Natural Gas Pipeline, and site ROW features such as communication towers and wind energy projects. There is expected to be a steady increase in demand for ROWs to accommodate new power, water, and telecommunication lines, wind projects, and communication sites. Major realty actions currently being considered in the sub-region include the Boardman to Hemingway and McNary-John Day 500-kV transmission line projects, other smaller transmission line projects, wind and geothermal energy projects with associated intertie lines, and communication sites. BLM management prescriptions that would limit the BLM's ability to accommodate ROW development would influence the level of cumulative impacts on lands and realty.

The Proposed Plan identifies the Boardman to Hemingway line as a high-priority project and considers limited exemptions to the proposed ROW restrictions for the project. Cumulative impacts from the development of this line would include increased ability to accommodate electrical transmission infrastructure demand in the short term. The line could also provide an opportunity for the collocation of future infrastructure to accommodate longer term demand. National policies to expand renewable energy production could also contribute to direct and indirect long-term cumulative impacts on the lands and realty program and be affected to various degrees by the proposed alternatives. As part of his 2013 Climate Action Plan, President Obama set a new energy goal of 10 new gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). This is expected to increase the demand for renewable energy ROWs in the planning area. Wind energy potential in the planning area is moderate to high (NREL 2009a), so alternatives that would restrict renewable energy development would have the greatest effect on the number of wind energy ROWs authorized under the lands and realty program.

Alternative A

Impacts on lands and realty across alternatives depend largely on the number of acres where the BLM would exclude or avoid new ROW development. Under Alternative A, the BLM would continue to authorize ROW development and temporary surface disturbance on a case-by-case basis. There would continue to be 857,600 acres of ROW exclusion areas and 3,445,700 of ROW avoidance

areas. As a result, cumulative impacts on lands and realty would occur only as new ROWs are proposed within avoidance areas. Alternative A would not further affect the BLM's ability to accommodate new ROW development.

Alternative B

BLM management would include increased levels of ROW restrictions, when compared to Alternative A. Designations of areas as avoidance or exclusion would not impact existing ROW authorizations. The restrictions would, however, impact the BLM's ability to accommodate future ROWs. Alternative B would prohibit ROW development in PHMA (4,547,000 acres) and avoid new ROWs in GHMA (5,662,600 acres). A prohibition on ROW development, particularly electrical transmission lines and wind energy developments in PHMA, would prevent the BLM from accommodating demand for new ROWs in those areas. Potential ROW applicants could seek authorizations in GHMA, subject to special siting and design conditions, or could choose to develop on land not administered by the BLM within or outside the planning area. This could increase environmental impacts on sensitive lands, increase permitting times, and decrease the overall effectiveness of the infrastructure system (i.e., the power grid, telecommunication system, or roadway network).

Development on adjacent lands could also result in indirect effects on BLM-administered lands (e.g., via increased vehicle traffic or requests for ROW authorizations for transmission lines). ROW development could also be directed to BLM lands outside the planning area, which would increase the workload on the BLM lands and realty programs in those areas, while decreasing workload for offices with lands in the planning area.

Alternative C

Alternative C would result in the greatest restriction on ROW development by designating PHMA and GHMA (10,216,400 acres) as ROW exclusion. ROW restrictions under Alternative C would eliminate the BLM's ability to accommodate new ROWs, including large-scale transmission lines, wind energy projects, and new or expanded communication facilities. Since southeastern Oregon has the greatest wind energy potential in the state (NREL 2009a), exclusion designations would decrease the state's overall wind energy generation capacity.

ROW applicants could seek authorizations on land not administered by the BLM but inside the planning area. This could increase environmental impacts on sensitive lands, increase permitting times, and decrease the overall effectiveness of the infrastructure system (i.e., the power grid, telecommunication system, or roadway network).

Development on adjacent lands could also result in indirect effects on BLM-administered lands (e.g., via increased vehicle traffic or requests for ROW authorizations for transmission lines). ROW development could also be directed to BLM lands outside the planning area. This would increase the

workload on the BLM lands and realty programs in those areas, while decreasing workload for offices with lands in the planning area.

Alternative D

Alternative D would increase the number of acres managed as ROW avoidance in PHMA by 2,617,900 acres (61 percent), compared to alternative A. Potential ROW applicants could seek authorizations in PHMA, subject to special siting and design conditions that minimize surface disturbance (e.g., underground placement), or they could choose to develop in areas outside PHMA. Accordingly, Alternative D would result in greater impacts on lands and realty than Alternative A, but less than Alternatives B and C.

Alternative E

Cumulative impacts under Alternative E are the same as Alternative B for core habitat areas and the same as Alternative A for low-density habitats.

Alternative F

Cumulative impacts under Alternative F are the same as Alternative B.

Proposed Plan

Under the Proposed Plan, BLM management would include increased levels of ROW restrictions, when compared to Alternative A. Designations of areas as avoidance for linear ROWs and exclusion for wind and solar ROWs would not impact existing ROW authorizations. The restrictions would, however, impact future ROW authorizations in the form of more complex project reviews and increased project costs. Management of PHMA as avoidance, combined with GRSG screening criteria, RDFs, buffers, and tall structure limitations, could discourage future development in PHMA and GHMA. The long-term cumulative effects could entail future ROW demand being redirected to areas outside GRSG habitat.

Limitations on mineral development, including NSO for fluid minerals and recommended withdrawal of SFA for locatable minerals, would reduce the demand for ROWs (e.g., roads, pipelines, or electrical distribution/transmission infrastructure) to support that development.

5.14 FLUID MINERALS

The area used to analyze cumulative impacts on fluid minerals is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect fluid minerals are existing and planned fluid mineral development projects on nonfederal mineral estate within the planning area. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. However, a reasonably foreseeable development scenario for geothermal potential was completed in the Geothermal Leasing Programmatic

Environmental Impact Statement (BLM and Forest Service 2008). Therefore, all estimates of future activity are based on **Table 5-23**, the BLM's assessment of fluid mineral trends, and the reasonably foreseeable development scenario for geothermal potential as developed in the Geothermal Programmatic EIS (BLM and Forest Service 2008).

The management actions proposed under this RMPA/EIS would cumulatively impact fluid mineral development through surface use restrictions (e.g., closures and NSO (with and without Waivers, Exceptions, and Modifications), CSU, and TL stipulations) that ultimately could decrease the amount of fluid mineral development in the planning area during the planning period.

Applying NSO stipulations could create cumulative closure impacts if areas surrounded by NSO buffers are beyond the reach of current drilling technologies. Closures and NSO stipulations would be the most likely management actions being considered in this RMPA/EIS to decrease fluid mineral development in the planning area. This decrease would have cumulative impacts by potentially increasing the need for foreign fuel imports due to a decrease in domestic availability of energy resources.

Additionally, the demand for mineral materials in the planning area may decrease due to reduced construction in the planning area. National policies to expand renewable energy production could also contribute to direct and indirect long-term cumulative impacts on the fluid minerals program and be affected to various degrees by the proposed alternatives.

As part of his 2013 Climate Action Plan, President Obama set a new energy goal of 10 new gigawatts of new renewable energy permitted on DOI lands by 2020 (The White House 2013). This is expected to increase the demand for renewable energy in the planning area. All of eastern Oregon has favorable geothermal resource potential (NREL 2009b). Because of this, alternatives that would restrict geothermal development could impact the federal government's ability to achieve the renewable energy goal set by President Obama.

Because closures and NSO stipulations would have the greatest impact on fluid mineral development, the cumulative effects of these management actions are discussed below. Managing areas as ROW exclusion or avoidance could also decrease the amount of fluid mineral development in the planning area. This would be due to limitations on access to both federal mineral estate and non-federal minerals. Operators would not be able to develop new roads through ROW exclusion areas to access mineral resources, and development of new roads through ROW avoidance areas would be difficult.

Applying a 3 percent cumulative disturbance cap would cause land uses on private, state, and other surface lands to have a cumulative impact on mineral materials in the planning area. If activities on private, state, and other surface lands disturbed the full 3 percent of the GRSG habitat in the planning area, no

further activities would be allowed on BLM-administered surface or on federal mineral estate. This would include mineral material development.

As described in **Section 3.12** Oregon is considered a pioneering area for fluid minerals. As such, oil and gas is not expected to be developed in the state unless economic conditions change. However, testing for natural gas is planned in the Vale District. Geothermal resources also exist throughout the planning area, and developers have expressed interest in extracting these resources in the foreseeable future. Geothermal commercial development has occurred on nonfederal land within the Vale District.

Alternative A

Under Alternative A, 3,497,100 acres (11 percent) of the minerals in the planning area would remain closed to fluid mineral development, and another 860,000 acres (3 percent) would remain subject to NSO stipulations. Cumulative impacts of these closures and NSO stipulations would be of the type described above for fluid minerals. Additionally, 4,303,300 acres (14 percent) of the planning area would continue to be managed as ROW exclusion or avoidance areas. These avoidance or exclusion areas would make it difficult for new fluid mineral project developers to construct necessary facilities. Because of this, management of these areas could cumulatively impact fluid mineral development in the planning area, as described above for fluid minerals.

Alternative B

The BLM would close 7,317,500 acres (23 percent) of the minerals in the planning area to fluid mineral development under Alternative B. The increase in acres closed compared to Alternative A represents 12 percent of the planning area. Approximately 586,800 acres (2 percent) of the minerals in the planning area would be subject to NSO stipulations. The decrease in acres subject to NSO stipulations, compared with Alternative A, is because acres subject to NSO stipulations under Alternative A would be closed under Alternative B.

Alternative B would also apply the 3 percent cap on disturbance within PHMA. If development on private, state, or other lands were to disturb 3 percent of PHMA, further development would not be allowed on BLM-administered lands or federal mineral estate. Because more of the planning area would be closed to fluid mineral development under Alternative B, the level of fluid mineral development in the planning area would likely decrease, compared with Alternative A. This decrease would reduce the supply of fluid minerals in Oregon and the United States and would impact the domestic energy mix, as described above for fluid minerals.

Managing PHMA as ROW avoidance would not have a cumulative impact on fluid minerals because these areas would be closed to fluid mineral development under Alternative B. Managing GHMA as ROW avoidance areas (5,662,600 acres, or 18 percent of the planning area) would reduce the level of new fluid

mineral development in the planning area by restricting construction of new roads and pipelines.

Alternative C

The BLM would close 11,699,400 acres (37 percent) of the planning area to fluid mineral development. The increase in acres closed compared to Alternative A represents 26 percent of the minerals in the planning area. Approximately 187,800 acres (1 percent) of the minerals in the planning area would be subject to NSO stipulations. The decrease in acres subject to NSO stipulations is because acres subject to NSO stipulations under Alternative A would be closed under Alternative C. Because more of the planning area would be closed to fluid mineral development under Alternative C, the level of fluid mineral development would likely decrease, compared with Alternative A. This decrease would reduce the supply of fluid minerals in Oregon and the United States and would impact the domestic energy mix, as described above for fluid minerals.

Managing occupied habitat as ROW exclusion areas would not have a cumulative impact on fluid minerals because these areas would be closed to fluid mineral development under Alternative C.

Alternative D

Like Alternative A, under Alternative D, the BLM would close 3,497,100 acres (11 percent) of the minerals in the planning area to fluid mineral development. Alternative D would also apply the 3 percent cap on disturbance within PHMA. If development on private, state, or other lands were to disturb 3 percent of PHMA, further development would not be allowed on BLM-administered lands or federal mineral estate.

The use of a buffer system surrounding GRSGLs would result in application of NSO stipulations, with Waivers, Exceptions, and Modifications, to 3,819,800 acres (12 percent) of the minerals in the planning area. The increase in acres subject to NSO stipulations, compared to Alternative A, represents 9 percent of the planning area.

As discussed above for fluid minerals, application of NSO stipulations could create cumulative closure effects if areas within NSO buffers were not reachable using directional drilling technology. This, in turn, could result in reduced fluid mineral development in the planning area.

Managing PHMA as ROW avoidance areas would impact fluid mineral development within those areas by restricting access to those minerals, as described above for fluid minerals. Because much of the federal mineral estate within PHMA would be subject to NSO stipulations under Alternative D, the cumulative impacts on fluid minerals of managing PHMA as ROW avoidance would be limited.

Alternative E

The cumulative impacts on fluid minerals are the same as those described under Alternative B.

Alternative F

The cumulative impacts on fluid minerals are the same as those described under Alternative C.

Proposed Plan

Under the Proposed Plan, NSO stipulations, with and without waivers, exceptions, and modifications, would apply to 4,333,700 acres (14 percent) of the minerals in the planning area. The increase in acres subject to NSO stipulations, compared to Alternative A, represents 11 percent of the planning area.

As discussed above for fluid minerals, NSO stipulations could create cumulative closure effects if areas within NSO buffers were not reachable using directional drilling technology. This, in turn, could reduce fluid mineral development in the planning area.

The Proposed Plan would also apply the 3 percent cap on disturbance in PHMA. If development on private, state, or other lands were to disturb 3 percent of PACs or project areas, further development would not be allowed on BLM-administered lands or federal mineral estate.

Managing PHMA as ROW avoidance areas would impact fluid mineral development within those areas by restricting access to those minerals, as described above for fluid minerals. Because federal mineral estate within PHMA would be subject to NSO stipulations under the Proposed Plan, the cumulative impacts on fluid minerals of managing PHMA as ROW avoidance would be limited.

5.15 LOCATABLE MINERALS

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect locatable minerals are existing and planned locatable mineral operations within the planning area but outside of the decision area. Locatable mineral resources are associated with the geological formations or units they are found within, which are typically localized and do not encompass large areas.

Additionally, not all geological formations contain mineral resources, or mineral resources could be found only in a portion of a certain geological formation. A Mineral Potential Report was not completed for this RMPA/EIS. All estimates are based on broad scaled “trends” review, which is an opinion as opposed to a methodological approach (see locatable minerals in Chapter 3). Assessment of locatable mineral occurrence potential in the planning area allows impact analysis to focus on those areas withdrawn or recommended for withdrawal

from locatable mineral entry that are actually likely to have locatable mineral resources and interest in their development.

While areas outside of the Oregon Sub-region may be recommended for withdrawal from locatable mineral entry as a result of decisions in other sub-regional LUPAs, expanding the cumulative impact analysis to include additional sub-regions would both dilute and inflate the impacts on locatable mineral development. Expansion of the cumulative impacts analysis area would dilute the impacts because the acres withdrawn or recommended for withdrawal across the GRSG range under the Proposed Plan would be minute compared to the total acreage of the range.

On the other hand, expansion of the cumulative impacts analysis area would inflate the impacts because many of the acres withdrawn or recommended for withdrawal across the GRSG range do not actually have locatable mineral resources that would be impacted. While data on locatable mineral occurrence potential are available for the planning area, similar data are not available across the GRSG range. Therefore, adding up areas withdrawn or recommended for withdrawal from locatable mineral entry beyond the planning area without accounting for where such entry is foreseeable would provide a less accurate picture of the cumulative impacts on locatable mineral development.

The cumulative impact analysis area used to analyze cumulative impacts on locatable minerals is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect locatable minerals are existing and planned locatable mineral operations on nonfederal mineral estate within the planning area. Locatable mineral activity is occurring throughout the planning area, and there is interest in additional development of locatable mineral resources within GRSG habitat, including interest in uranium development in the Vale District. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. Therefore, all estimates of future activity are based on **Table 5-23** and on the BLM's assessment of locatable mineral trends.

Withdrawing an area from locatable mineral entry precludes locatable mineral resource development in that area. This would decrease the total amount of locatable mineral development in the planning area. It would in turn reduce the amount of locatable minerals available to markets within Oregon and the United States, which could impact industries that depend on these minerals. For example, high tech industries and renewable energy developers depend on certain locatable minerals as raw materials. If these minerals were to become scarcer as a result of the withdrawals recommended under this RMPA/EIS, additional imported materials could be required.

Applying a 3 percent cumulative disturbance cap would cause land uses on private, state, or other surface lands to have a cumulative impact on locatable minerals in the planning area. Activities on private, state, or other surface lands could disturb the full 3 percent of the GRS habitat in the planning area. In such a case, plans of operation for locatable mineral development on BLM-administered surface or on federal mineral estate would be required to incorporate mitigation measures to avoid further surface disturbance.

Alternative A

Under Alternative A, 1,435,900 acres would remain withdrawn from locatable mineral entry, and 24,400 acres would be recommended for withdrawal, for a total of 1,460,300 acres (5 percent of the planning area). Locatable mineral development would still be allowed in the remaining 95 percent of the planning area, with limited impacts on supply from withdrawals.

Alternative B

In addition to the 1,435,900 withdrawn acres, the BLM would recommend for withdrawal 4,612,200 acres, for a total of 6,048,100 acres (19 percent of the planning area). The increase in acres withdrawn or recommended for withdrawal between Alternative A and Alternative B represents 14 percent of the planning area. If all of these acres were withdrawn by Secretarial Order or Act of Congress, locatable mineral development and availability in the planning area would decrease, with the effects described above for locatable minerals. Alternative B would also apply the 3 percent cap on disturbance within PHMA. Development of locatable minerals could constrain other development.

Alternative C

In addition to the 1,435,900 withdrawn acres, the BLM would recommend for withdrawal 9,987,900 acres, for a total of 11,423,800 acres (36 percent of the planning area). The increase in acres withdrawn or recommended for withdrawal between Alternative A and Alternative C represents 31 percent of the planning area. If all of these acres were withdrawn by Secretarial Order or Act of Congress, locatable mineral development and availability in the planning area would decrease, with the effects described above for locatable minerals. This alternative would have the greatest cumulative impacts because it recommends the most acres for withdrawal.

Alternative D

The cumulative impacts on locatable minerals are similar to those under Alternative A. However, Alternative D would apply the 3 percent cap on disturbance within PHMA. Development of locatable minerals could constrain other development.

Alternative E

The cumulative impacts on locatable minerals are the same as those under Alternative B.

Alternative F

The cumulative impacts on locatable minerals are the same as those under Alternative B.

Proposed Plan

In addition to the 1,435,900 withdrawn acres, the BLM would recommend 1,835,800 acres for withdrawal, for a total of 3,271,700 acres (10 percent of the planning area). The increase in acres withdrawn or recommended for withdrawal between Alternative A and the Proposed Plan represents 5 percent of the planning area. If all of these acres were withdrawn by Secretarial Order or act of Congress, locatable mineral development and availability in the planning area would decrease, with the effects described above for locatable minerals. The Proposed Plan would also apply the 3 percent cap on disturbance in PHMA. Development of locatable minerals could constrain other development if it were to exceed the cap.

5.16 MINERAL MATERIALS (SALABLES)

The cumulative impact analysis area used to analyze cumulative impacts on mineral materials is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect mineral materials are existing and planned mineral material development projects on nonfederal mineral estate within the planning area. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. Therefore, all estimates of future activity are based on **Table 5-23** and on the BLM's assessment of mineral material trends.

Closing areas to mineral material disposal would decrease the level of mineral material development within the planning area. This would reduce the available supply of minerals for construction projects, including infrastructure maintenance. Because construction typically uses mineral materials from nearby, the decrease in locally available supplies would impact the feasibility of these projects. For example, development for renewable energy, fluid minerals, locatable minerals, and nonenergy solid leasable minerals and highway construction all depend on mineral materials. This includes county and other government access to materials through the free use permit process, used for infrastructure development and maintenance. These project developers would have to source mineral materials from farther away, or the projects may not be able to be completed if mineral materials are not locally available.

Applying a 3 percent cumulative disturbance cap would cause land uses on private, state, or other surface lands to have a cumulative impact on mineral materials in the planning area. If activities on private, state, or other surface lands were to disturb the full 3 percent of PHMA in the planning area, no

further activities, including mineral material development, would be allowed on BLM-administered surface or on federal mineral estate.

Alternative A

Under Alternative A, 3,611,700 acres (11 percent) of the planning area would continue to be closed to mineral materials disposal. Developers could not create new mineral material pits within these areas. The availability of mineral materials to supply construction projects on state, private, BLM-administered, or other lands would be reduced, as described above for mineral materials (salables).

Alternative B

The number of acres closed to mineral material disposal would increase to 7,311,600 acres (23 percent of the planning area). The increase in acres closed to mineral material disposal compared to Alternative A represents 13 percent of the planning area.

More acres would be closed to mineral material disposal under Alternative B. Because of this, the availability of mineral materials to supply construction projects in the planning area would be reduced. Additionally, all GHMA would be managed as ROW avoidance areas.

This management would restrict development of construction projects, such as road building, that create demand for mineral materials. As such, it would reduce mineral material development in the planning area.

Alternative B would also apply the 3 percent cap on disturbance within PHMA. If development on private, state, or other lands were to disturb 3 percent of PHMA, further development would not be allowed on BLM-administered lands or federal mineral estate.

Alternative C

The number of acres closed to mineral material disposal would increase to 11,753,400 acres (37 percent of the planning area). The increase in acres closed to mineral material disposal, compared to Alternative A, represents 26 percent of the planning area. Because of this, the availability of mineral materials to supply construction projects in the planning area would be reduced. This alternative would close the most acres to mineral material disposal and would therefore have the greatest cumulative impact within the planning area.

Alternative D

Cumulative impacts on mineral materials are the same as those under Alternative B.

Alternative E

Cumulative impacts on mineral materials are the same as those under Alternative B.

Alternative F

As with Alternative B, the BLM would close 7,311,600 acres (23 percent) of the planning area to mineral material disposal. Therefore, the availability of mineral materials in the planning area would decrease. However, demand for mineral materials in the planning area would greatly decrease on the additional 5,669,400 acres (18 percent) of the planning area that would be managed as ROW exclusion. Therefore, new mineral material development would not occur on the 12,981,000 acres (41 percent) of the planning area that would be either closed to mineral material disposal or closed to the activities that create demand for mineral materials.

Proposed Plan

Under the Proposed Plan, approximately 7,343,300 acres of federal mineral estate in PHMA (23 percent of the planning area) would be closed to mineral material disposal. Therefore, the availability of mineral materials in the planning area would decrease.

The Proposed Plan would also apply the 3 percent cap on disturbance in PHMA. If development on private, state, or other lands were to disturb 3 percent of PACs or project area, further development would not be allowed on BLM-administered lands or federal mineral estate.

Additionally, all GHMA would be managed as ROW avoidance areas, reducing demand for mineral materials in GHMA.

5.17 NONENERGY LEASABLE MINERALS

The cumulative impact analysis area used to analyze cumulative impacts on nonenergy leasable minerals is the planning area, which covers 31,756,500 acres.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect nonenergy leasable minerals are existing and planned nonenergy leasable development projects on nonfederal mineral estate within the planning area. Reasonably foreseeable development scenarios and mineral potential reports were not completed for this RMPA/EIS. Therefore, all estimates of future activity are based on **Table 5-23** and on the BLM's assessment of nonenergy leasable mineral trends.

As discussed in nonenergy leasable minerals in Chapter 3, most nonenergy leasable mineral development in the planning area occurs on hardrock mineral deposits beneath acquired lands. The trends for these minerals are the same as those for locatable mineral activity, which is occurring throughout the planning area.

Closing areas to nonenergy leasable mineral development would reduce the availability of hardrock minerals from within the planning area. These minerals are necessary for raw materials in such sectors as high tech industries and

renewable energy. Therefore, development in these planning area sectors could be impacted by reduced supplies of hardrock minerals from beneath acquired lands.

Applying NSO stipulations to nonenergy leasable mineral development restricts that development. This could either make such development impossible or cause developers to move to private, state, or other lands with similar resources that do not have such restrictions. Therefore, development of nonenergy leasables on federal mineral estate in the planning area could decrease as a result of NSO stipulations.

Applying a 3 percent cumulative disturbance cap would cause land uses on private, state, or other surface lands to have a cumulative impact on nonenergy solid leasable minerals in the planning area. If activities on private, state, or other surface lands were to disturb the full 3 percent of the GRSG habitat in the planning area, no further activities, including nonenergy solid leasable mineral development, would be allowed on BLM-administered surface or on federal mineral estate.

Alternative A

Approximately 3,073,600 acres (10 percent) of the planning area would remain closed to nonenergy solid mineral prospecting and leasing. These closures would reduce the availability of hardrock minerals in the planning area, as described above for nonenergy leasable minerals.

Alternative B

The BLM would close 7,217,500 acres (23 percent) of the planning area to nonenergy solid mineral prospecting and leasing. The increase in acres closed compared with Alternative A represents 13 percent of the planning area. Because more of the planning area would be closed to nonenergy solid leasable mineral development under Alternative B, the cumulative impacts of reduced supplies of hardrock minerals would be more severe. Alternative B would also apply the 3 percent cap on disturbance within PHMA. If development on private, state, or other lands were to disturb 3 percent of PHMA, further development would not be allowed on BLM-administered lands or federal mineral estate.

Alternative C

The BLM would close 11,699,400 acres (37 percent) of the planning area to nonenergy solid mineral prospecting and leasing. The increase in acres closed compared with Alternative A represents 27 percent of the planning area. Because more of the planning area would be closed to nonenergy solid leasable mineral development under Alternative C, the cumulative impacts in the form of reduced supplies of hardrock minerals would be more severe. Alternative C represents the most restrictive management of nonenergy solid leasable minerals. For this reason, it have the greatest cumulative impacts within the planning area.

Alternative D

The BLM would apply NSO stipulations to nonenergy solid mineral leases on 3,270,400 acres (10 percent) of the planning area. Like Alternative A, 3,073,600 acres (10 percent) of the planning area would remain closed to nonenergy solid mineral prospecting and leasing.

Areas would be subject to NSO stipulations under Alternative D, where they would not be subject to those stipulations under Alternative A. As such, nonenergy leasable mineral development in the planning area would be more restricted under Alternative D. Development of nonenergy leasable minerals on federal mineral estate in the planning area may decrease, with the supply impacts described above for nonenergy leasable minerals.

Alternative D would also apply the 3 percent cap on disturbance within PHMA. If development on private, state, or other lands were to disturb 3 percent of PHMA, further development would not be allowed on BLM-administered lands or federal mineral estate.

Alternative E

Cumulative impacts on nonenergy leasable minerals are the same as those under Alternative B.

Alternative F

Cumulative impacts on nonenergy leasable minerals are the same as those under Alternative B.

Proposed Plan

The BLM would close 7,247,900 acres (23 percent) of the planning area to nonenergy solid mineral prospecting and leasing. The increase in acres closed compared with Alternative A represents 13 percent of the planning area. Because more of the planning area would be closed to nonenergy solid leasable mineral development under the Proposed Plan, the cumulative impacts of reduced supplies of hardrock minerals would be more severe. The Proposed Plan would also apply the 3 percent cap on disturbance within PHMA. If development on private, state, or other lands were to disturb 3 percent of PACs or project area, further development would not be allowed on BLM-administered lands or federal mineral estate.

5.18 SPECIAL DESIGNATIONS

This cumulative impact analysis focuses on Areas of Critical Environmental Concerns. This is the only special designation discussed in special designations in Chapter 3, which would be affected by any of the alternatives.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect ACECs are any that would impact the relevant and important values for which the ACECs were established (e.g., GRS habitat health). Such actions are

surface-disturbing activities, increased recreational demands, and climate change. RNAs in particular would experience cumulative impacts from climate change, which would likely produce major changes in the current vegetation communities.

Cumulative impacts on existing ACECs under the various alternatives could result from actions and decisions not associated with the BLM on lands next to ACECs. While protections exist within the ACECs, population growth, development, and recreation throughout the planning area could, over time, encroach on these areas. The ACEC values could be degraded by such as factors as unauthorized off-route travel, trash dumping, increased noise, air pollution, and light pollution. Other impacts include species displacement, habitat fragmentation, and changes to the visual landscape that could affect resources within ACECs. Impacts would be greater where recreation areas or development are next to an ACEC.

There are a few proposed transmission lines and pending energy development projects within the planning area. If these transmission lines, facilities, or associated roads were to run through or be next to any of the ACECs, it could damage the relevant and important values for which these ACECs are designated. Future transmission line construction, energy development, and roads in the planning area could result in cumulative impacts on existing ACECs. Examples of long-term impacts on the ACEC from these activities are noise, heavy vehicle traffic, and dust.

Ongoing invasive plant treatment, fuels management, and restoration projects in the planning area could also result in short-term cumulative impacts on ACECs; however, they would likely improve ACEC values in the long term by maintaining natural vegetation.

Climate change could also pose a long-term threat of cumulative impacts on the relevant and important values of ACECs, especially RNAs. Cumulative impacts on GRS habitat, and consequently on the ACEC, from climate change could include vegetation regime changes (e.g., from sagebrush to grasslands).

Alternatives Analysis

All action alternatives would restrict such activities as ROW development, livestock grazing, mineral entry, and new road construction. This could indirectly protect ACECs. Additionally, ACEC management includes restrictions, such as the application of NSOs, that protect ACECs from uses and actions that would impair important and relevant values. Despite these protections, over time ACECs could experience cumulative impacts from existing and future ROWs, oil, gas, and geothermal development, and travel routes in the vicinity. Impacts are described in special designations in Chapter 4, and include impacts such as soil erosion, disturbance of GRS populations and vegetation due to construction, operation and maintenance, and habitat fragmentation.

The seven ACECs that identify GRSG as an important and relevant value could experience additional protections. They could have more restrictions on resource uses and surface-disturbing activities than ACECs that do not identify GRSG as an important and relevant value. Moreover, the 33 ACECs identified in **Chapter 3, Special Designations**, as having a majority of their total acres in PHMA are also more likely to experience protections from GRSG management actions.

Under Alternatives C and F, new ACECs would be created for the important and relevant value of GRSG. Additionally, under Alternative D, ACECs with large proportions of GRSG habitat would be managed for GRSG conservation, and, as such, would restrict resource uses within those ACECs. Under the Proposed Plan, key RNAs and ACECs would experience additional restrictions on uses and GRSG would be added as a value for one of the key ACECs. Most of the key RNAs would be fenced to minimize impacts on leks, which would have the additional benefit of protecting vegetative communities in the RNAs. The ACECs under Alternatives C, D, and F and the Proposed Plan would be less likely to experience cumulative degradation to their important and relevant values due to management actions focused on GRSG conservation.

The BLM would adaptively manage to protect ACEC values and minimize impacts where applicable and feasible.

5.19 SOIL RESOURCES

The cumulative impact analysis area used to analyze cumulative impacts on soils covers the planning area. Under all alternatives, federal and state laws, regulations, standards, assessments, and BMPs would be applied to rangeland management, ROW authorizations, travel management, and mineral development. Under all alternatives, the BLM would continue to authorize ROW development and temporary surface disturbance on a case-by-case basis. Effects under the different alternatives are the result of the number of acres open or closed to surface disturbance.

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect soil resources are those associated with surface-disturbing activities.

Disturbing land surfaces can expose soils to wind and rain, which may remove surface cover, increase soil erosion rates and compact the soil. Compaction may decrease water infiltration and increase surface runoff. Disturbance removes vegetation outright and may remove biological soil crusts that cover and protect the land surface.

Land management programs that disturb land surfaces are livestock grazing and wild horse and burro management, OHV recreation, lands and realty authorizations and associated transmission lines, wildland fire suppression, vegetation management, and energy and mineral development. Projects that

initially disturb the surface but eventually improve soil health are improvement and restoration projects that are based on vegetation and habitat management objectives and wildland fire restoration.

Operations and developments that impact soil surfaces are ROW authorizations and associated transmission lines, roads granted under the lands and realty program, and mineral and energy development projects approved by the mineral program.

Planned and reasonably foreseeable projects and actions that may affect soil resources within the planning area are 5 ROW authorizations involving 4 transmission lines, and a communication site upgrade; 9 energy and mineral developments, involving a natural gas project, 3 wind energy projects, and 5 mineral developments; 24 vegetation management projects, including 7 fire-specific projects and 4 projects specifically dealing with invasive plants; a recreation plan that involves building new facilities and trails; a district-wide wild horse gather; and 37 livestock grazing permit renewals. These projects, developments, and land management actions are detailed in **Table 5-23**.

Alternative C would be the most restrictive alternative and therefore the most protective of soil resources. Alternative F would be the second most restrictive, and Alternative B would be the third. Alternative A would be the least restrictive, while Alternatives D and E would be more restrictive than A, but less restrictive than B, F, or C. Alternative D would be more restrictive than E. From the most restrictive to the least restrictive, the alternatives are C, F, B, D, E, and A. The Proposed Plan is most like Alternative B, with additional restrictions in some program areas that align with other alternatives.

Under all alternatives, vegetation management would occur. Of the 24 vegetation management projects, 10 would use prescribed fire or pile burning to reduce hazardous fuels and juniper expansion. Four more projects would reduce hazardous fuels through mechanical removal, and three more would focus on post-fire stabilization and rehabilitation through reseeding.

Vegetation management projects would have the same effects on soil resources under any chosen alternative. Fuels management disturbs and compacts soil during vegetation removal using heavy mechanical equipment (mastication projects) and fire line construction for prescribed fire treatments. However, fuels reduction and fuel breaks allow for better control and better response to an active wildfire. They also may decrease the overall number of acres burned during a fire.

A fire of any size can impact soil resources through the loss of stabilizing vegetation or biological crust cover. This could increase erosion rates if exposure is ill timed with seasonal precipitation soon after the loss of cover. Depending on its severity (heat introduced into the soil) and duration, fire can alter the soil's physical, chemical, and biological properties and open the area

burned to potential invasive plants. Post-fire stabilization, rehabilitation, and reseeding can reduce overall erosion of the exposed soil from wind and water and can reduce the potential for nonnative plant invasion.

The remaining vegetation management projects focus on reducing invasive plants in the planning area (four projects) and vegetation management (five projects), mainly removing juniper to return vegetation communities to historic compositions. Vegetation management is initially disturbing to soils when undesirable vegetation is removed with heavy mechanical equipment (mastication or machine piled). Soil disturbance may be minimal using a rangeland drill or broadcast spreaders on all terrain vehicles to seed areas. Application by air of seed or herbicide does not disturb soil. The success of vegetation management largely depends on adequate precipitation amounts and timing. It may take several attempts before new seeds become established. Removing invasive plants, such as juniper, has demonstrated hydrological improvements in a very short, one season time frame. The improvement to soil health depends on a combined hydrologic and vegetation interaction that may require a decade after the initial disturbance.

Alternative A

Under Alternative A, current management would continue on BLM-administered lands in the planning area. There would be no PHMA or GHMA designated, and most land use plans would not implement use restrictions (e.g., ROW exclusion, travel management restrictions, livestock grazing closures, and energy and mineral development closures) to protect GRS habitat. Planned ROW construction may increase compaction and displace soils. This would be the case if associated roads, transmission lines, or pipelines were cleared of vegetation and constructed. Also, new fluid mineral developments may increase loss of vegetation cover through both permanent and temporary roads, drilled wells and associated well pads, and soil excavations during mineral extraction. In addition, fluid mineral development may require associated pipelines and transmission lines, along with the construction of necessary service roads for these facilities.

Some use restrictions would be implemented, which may protect soils in these areas from degradation or removal. Overall, Alternative A would allow the highest level of surface disturbance of all alternatives; therefore, Alternative A would provide for the most possible impacts on soil resources from ROW and mineral developments, livestock grazing, and travel management.

Alternative B

Under Alternative B, PHMA and GHMA would be designated as ROW exclusion and avoidance areas. This would concentrate potential impacts from ROW authorizations and associated road or transmission line projects to non-habitat areas. Alternative B would provide for more ROW exclusion acres than Alternatives A, D, and E and less ROW exclusions acres than Alternatives C

and F. ROW exclusion areas are protected from surface-disturbing activities of ROW authorizations and associated roads and structures.

Alternative B would close fewer acres to livestock grazing than Alternatives D, C, and F. It would close the same number of acres to livestock grazing as Alternatives A and E. Closure to grazing may allow recovery of the soil resources through active or passive restoration.

Alternatives B, D, and F would all manage 7,996,000 acres as restricted to existing trails. This is more than Alternatives A and E and less than Alternative C. More restriction on cross-country travel may result in more predictable, localized, and manageable impacts on soil resources. Alternatives B, C, D, and F would manage 300,300 of acres as closed to cross-country travel management, which is greater than Alternatives A and E. Overall, Alternative B would provide for more travel restrictions than Alternative, A and E, the same amount as Alternatives D and F, and less than Alternative C.

Alternative B has more acres closed or withdrawn from energy and mineral development (locatables, leasables, nonenergy leasables, and mineral materials) than Alternatives A and D. It has the same number of acres closed as Alternative E and fewer acres closed to energy and mineral development than Alternatives C and F. Alternatives B and F have the same amount of closures to locatable mineral entry, mineral material disposal, and nonenergy leasable minerals. Alternative B has fewer acres closed to fluid mineral leasing than Alternative F. Alternatives B and D have the same amount of mineral material disposal, and Alternative B has more acres closed to nonenergy leasables, fluid mineral leasing, and locatable mineral entry than Alternative D. Alternative B would provide for more protection of soil resources from mineral and energy development than Alternatives A and D and the same amount of protection as Alternative E.

Overall, Alternative B would be more protective of soil resources than Alternatives A and D and less protective than Alternatives C and F. While Alternatives B and E are similar in their amount of closures to mineral resources, Alternative B has more closures to livestock grazing, more ROW exclusion areas, and more acres restricted to existing roads and trails than Alternative E. This makes Alternative B more protective of soil resources than Alternative E.

Alternative C

Alternative C would remove all grazing from the project area. This would eliminate any impacts on soil resources from livestock grazing, including trampling of vegetation, removal of biological crusts and compaction of soil near water resources or during wet times of use. Alternative C would not allow for the renewal of the 37 livestock grazing permits that are reasonably foreseeable actions.

Alternative C would also close the most acreage to mineral entry, which may prevent some of the 15 planned energy and mineral development projects.

Additionally, Alternative C would have the greatest amount of ROW exclusion and avoidance areas and would limit the most amount of acreage to existing routes under travel management. Alternative C would concentrate ROW authorization and associated transmission lines and roads outside of GRSG habitat and would concentrate impacts from travel management to existing route areas.

Due to the extent of land closures, Alternative C would provide the most protection of soil resources. Alternative C would also result in the most restrictions to the cumulative effects projects. It may prohibit new ROW authorization and developments and mineral and energy development with the exception to locatable minerals. As a result, Alternative C would result in the greatest reduction in cumulative effects from past, present, and reasonably foreseeable actions, compared to all alternatives.

Alternative D

ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,000 acres. The overall effects of lands and realty management are very similar to Alternative A because an increase in ROW avoidance areas does not prohibit ROW authorizations.

Alternative D would be more protective of soil resources from the potential effects of livestock grazing than Alternatives A, B, or E due to more closures to livestock grazing. It would be less protective of soils than Alternatives C and F.

Alternative D would have more restrictions on cross-country travel than Alternatives A and E. It would have the same number of restrictions as Alternatives B and F and fewer than Alternative C.

Alternatives D and A would manage the same amount of closures to locatable mineral entry, fluid mineral leasing, and nonenergy leasables. It would recommend the same amount for acreage for withdrawal for locatable mineral entry. Alternative D would provide for more closures to mineral materials than Alternative A. Overall, Alternative D is more protective of soil resources from mineral development than Alternative A, due to more closures to mineral materials. However, it is less protective of energy and mineral development than Alternatives B, C, E, and F.

Alternative D would be more protective of soil resources than Alternatives A and E from potential impacts from livestock grazing and travel management due to more closures. However, it would be less protective of soil resources from ROW authorizations and associated development and from energy and mineral development than under Alternatives B, C, D, and E.

Alternative E

Alternative E would manage for the fewest ROW exclusion areas. It would be less protective of soil resources from the potential effects of ROW authorizations and associated development than Alternatives B, C, and F.

The effects on soil resources from ROW authorizations under Alternative E are similar to those under Alternatives A and D. Alternative E would be less protective of soil resources from the potential effects of livestock grazing than Alternatives B, C, and F. It would have the same number of closures as Alternatives A and D.

The effects on soil resources from livestock grazing under Alternative E are similar to those under Alternatives A and D. Alternative E would manage more acres as restricted to existing roads and trails for cross-country travel as Alternative A but fewer than Alternatives B, C, D, and F.

Energy and mineral development under Alternative E would be managed the same as under Alternative B. As a result, the cumulative impacts from past, present, and reasonably foreseeable actions would be reduced, compared to Alternative A, but to a lesser extent than the other action alternatives.

Alternative F

Alternative F would have the same amount of acreage managed as ROW avoidance and exclusion areas as Alternative C. Alternative F would manage the same amount of acreage as limited to existing roads and trails as Alternatives B and D, which are more than Alternatives A and E and less than Alternative C. Alternative F would manage more acres as closed to livestock grazing as Alternatives A, B, D and E and fewer acres than Alternative C. Alternative F would manage the largest category of acreage as closed to fluid mineral leasing and the second largest amount of acres closed under nonenergy solid leasables, locatables, and mineral material sales.

Alternative F would be less restrictive of surface-disturbing activities than Alternative C, but it would be more restrictive than Alternatives A, B, D, and E. Alternative F may restrict the ROW and mineral developments in **Table 5-23**, which may prevent any impacts on soil resources from these projects.

Proposed Plan

The Proposed Action would manage energy and mineral development with a 3 percent disturbance cap (no more than 1 percent each decade over three decades), which would result in more protection for soil resources from development than Alternatives C, E, and F once the cap is reached.

Cumulative impacts from the Proposed Plan are similar to those described for Alternatives A, B, and C. The Proposed Plan would manage 12,292,000 acres as open to livestock grazing, which is approximately 20,000 acres more than Alternative A, and would emphasize the SRH parameters. Livestock grazing

would be managed similarly to Alternative B. The Proposed Action would manage 1,203,000 acres as open to cross-county motorized travel, 367,000 acres as closed to cross-country travel, and 11,043,000 acres as limited to existing routes, which is most similar to Alternative C. The Proposed Action would manage similar acres as ROW avoidance as Alternative A but would manage 6,469,000 more acres as avoidance areas. The Proposed Action would manage locatable mineral entry as more restrictive than Alternatives A and D and less restrictive than Alternatives B, C, E, and F. The Proposed Action would manage mineral materials as less restrictive than Alternative C and similar to Alternatives B, D, E, and F. Nonenergy leasables would be managed the same as Alternative B and fluid minerals as less restrictive than Alternatives B, C, and F.

5.20 WATER RESOURCES

The area used to analyze cumulative impacts on water resources is the entire planning area. Under all alternatives, federal and state laws, regulations, standards, assessments, and BMPs would be applied to rangeland management, ROW authorizations, travel management, and mineral development. Under all alternatives, the BLM would continue to authorize ROW development and temporary surface disturbance on a case-by-case basis. Effects under the different alternatives are the result of the number of acres open or closed to a surface-disturbing activity.

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect water resources are vegetation and habitat management and improvement projects, livestock grazing management, lands and realty management, recreation, travel management, and energy and mineral development.

These management actions disturb land surface; surface-disturbing activities may result in vegetation trampling or clearing and excavation of surface materials, which may increase sedimentation in waterways. In addition livestock may use riparian and wetland areas for water and shade and may congregate around water developments. This would result in compacted soil, decreased water quality due to fecal coliforms, trampled nearby vegetation, and reduced riparian community conditions and hydrologic functionality. These effects could negatively impact water resources, depending on their proximity to waterways, the timing of surface disturbance, local vegetation, and their location in the watershed. The more acreage an alternative closes to surface-disturbing activities, the more protection the alternative affords water resources by eliminating the potential for impact.

Planned and reasonably foreseeable projects and actions that may affect water resources within the planning area are 5 ROW authorizations, involving 4 transmission lines, and a communication site upgrade; 9 energy and mineral developments, involving a natural gas project, 3 wind energy projects, and 5 mineral developments; 24 vegetation management projects, including 7 fire-

specific projects and 4 projects specifically dealing with invasive plants; a recreation plan that involves building new facilities and trails; a district-wide wild horse gather; and 37 livestock grazing permit renewals. These projects, developments, and land management actions are detailed in **Table 5-23**.

As discussed below by alternative, Alternative C would be the most restrictive and therefore the most protective of water resources. Alternative F would be the second most restrictive, and Alternative B would be the third. Alternative A would be the least restrictive, while Alternatives D and E would be more restrictive than Alternative A but less restrictive than Alternatives B, F, or C. Alternative D would be more restrictive than E. From the most restrictive to the least restrictive, the Alternatives are C, F, B, D, E, A. The Proposed Plan is most like Alternative B, with additional restrictions in some program areas that align with other alternatives.

Vegetation would be managed under all alternatives. Of the 24 vegetation management projects, 10 would use prescribed fire or pile burning to reduce hazardous fuels and to reduce juniper expansion. Four projects would reduce hazardous fuels through mechanical removal, and three would focus on post-fire stabilization and rehabilitation through reseeding. Vegetation management projects would have the same effects on water resources under any chosen alternative. The effects of fire on water resources are determined largely by the severity of the fire, the decisions made relative to any suppression activities, and the immediate post-fire precipitation. Effects of fire on water resources can occur under all alternatives and can include a short-term decrease in water quality. This would be due to increased particulate loads and stream flow and average storm flow discharge from lower vegetation density and reduced soil cover (litter or biological crusts), both of which allow proper infiltration of water. After-fire stabilization and establishing seedings can reduce overall erosion of the exposed soil from wind and water.

The remaining vegetation management projects focus on reducing invasive plants in the planning area (four projects) and vegetation management (five projects), mainly removing juniper to return vegetation communities to historic compositions. Direct effects of vegetation management may temporarily decrease water quality through increased sediment delivery to waterways from undesirable vegetation clearing or burning. Particularly if heavy mechanical equipment is used in place of manual means. The long-term effects of vegetation management would protect water quality by reducing runoff and sediment delivery into surface waters through stabilization of soils with vegetation.

Alternative A

Under Alternative A, current management would continue on BLM-administered lands in the planning area. There would be no PHMA or GHMA designated. Most land use plans would not implement use restrictions (e.g., ROW exclusion, travel management restrictions, livestock grazing closures, and

closure to energy and mineral development) to protect GRSG habitat. Planned ROW construction would be permitted with conditions of approval. These include that the holder of the rights comply with the Water Quality Act and other federal and state laws, which would protect water resources from degradation.

Potential impacts from locatable mineral, mineral material, nonenergy leasable, and fluid leasable mineral activity often result from violation of mineral regulations. These can include the release of pollutants capable of contaminating surface water or aquifers during groundwater recharge as a result of use, storage, and transportation of hazardous fluids and compounds. Impacts from mineral activity are regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval. These measures have effectively reduced the potential of surface or groundwater contamination.

Some use restrictions would be implemented, which would protect soils in these areas from degradation or removal. Overall, Alternative A would allow the highest level of surface disturbance of all alternatives; therefore, it would provide for the most possible impacts on water resources from ROW and mineral developments, livestock grazing, and travel management.

Alternative B

Under Alternative B, PHMA and GHMA would be designated as ROW exclusion and avoidance areas. This would concentrate potential impacts from ROW authorizations and associated road or transmission line projects in nonhabitat areas. Alternative B would provide for more ROW exclusion acres than Alternatives A, D, and E and fewer ROW exclusions acres than Alternatives C and F. ROW exclusion areas are protected from the surface-disturbing activities of ROW authorizations and associated roads and structures.

Alternative B would have fewer acres closed to livestock grazing than Alternatives D, C, and F. It would have the same amount of closure to livestock grazing as Alternatives A and E. The 37 planned livestock grazing permit renewals may be impacted, depending if their location were to coincide with the closures to livestock grazing. This could allow water resources to maintain or improve water quality levels through active or passive restoration.

Alternatives B, D, and F would all manage 7,996,000 acres as restricted to existing trails. This is more than Alternatives A and E and less than Alternative C. More restrictions on cross-country travel may result in more predictable, localized, and manageable impacts of soil delivery into water resources. Alternatives B, C, D, and F would manage 300,300 of acres as closed to cross-country travel management, which is greater than Alternatives A and E. Overall, Alternative B would provide for more travel restrictions than Alternatives A and E, the same amount as Alternatives D and F, and fewer than Alternative C.

Alternative B has more acreage closed or withdrawn from energy and mineral development (locatables, leasables, nonenergy leasables, and mineral materials) than Alternative A and D. It has the same number of closed acres as Alternative E and fewer acres closed to energy and mineral development than Alternatives C and F. Alternative B and F have the same number of closures to locatable mineral entry, mineral material disposal, and nonenergy leasable minerals. Alternative B has fewer acres closed to fluid mineral leasing than Alternative F. Alternatives B and D have the same amount of mineral material disposal, and Alternative B has more acres closed to nonenergy leasables, fluid mineral leasing, and locatable mineral entry than Alternative D. Alternative B would provide for more protection of water resources from mineral and energy development than Alternatives A and D and the same amount of protection as Alternative E.

Overall, Alternative B would be more protective of water resources than Alternatives A and D and less protective than Alternatives C and F. While Alternatives B and E are similar in their number of closures to mineral resources, Alternative B has more closures to livestock grazing, more ROW exclusion areas, and more acres restricted to existing roads and trails than Alternative E. This makes Alternative B more protective of water resources than Alternative E.

Alternative C

Alternative C would remove all grazing from the project area, which would eliminate any impacts on water resources from livestock grazing, including vegetation trampling, biological crust removal and soil compaction near water resources. Alternative C would not allow for the renewal of the 37 livestock grazing permits that are reasonably foreseeable actions.

Alternative C would also close the most acres of all alternatives to mineral entry, which may prevent some of the 15 planned energy and mineral development projects.

Additionally, Alternative C would have the most ROW exclusion and avoidance areas and would limit the most acres to existing routes under travel management. Alternative C would concentrate ROW authorization and associated transmission lines and roads outside of GRSG habitat and would concentrate impacts from travel management to existing routes.

Due to the extent of land closures, Alternative C would be most protective of water resources of all the alternatives. Alternative C would also most restrict the cumulative effects projects. It may prohibit new ROW authorization and developments and mineral and energy development. As a result, Alternative C would result in the greatest reduction in cumulative effects from past, present, and reasonably foreseeable actions.

Alternative D

ROW exclusion areas under Alternative D would be the same as Alternative A, and ROW avoidance areas would increase by 2,519,000 acres. The overall effects of lands and realty management are very similar to Alternative A. This is because an increase in ROW avoidance areas does not prohibit ROW authorizations.

Alternative D would be more protective of water resources from the potential effects of livestock grazing than Alternatives A, B, and E, due to more closures to livestock grazing, and less protective than Alternatives C and F.

Alternative D would have more restrictions to cross-country travel than Alternatives A and E. It would have the same level of restrictions as Alternatives B and F and fewer restrictions than Alternative C.

Alternatives D and A would manage the same number of closures to locatable mineral entry, fluid mineral leasing, and nonenergy leasables. It would recommend the same number of acres for withdrawal from locatable mineral entry. Alternative D would provide for more closures to mineral materials than Alternative A. Overall, Alternative D is more protective of water resources from mineral development than Alternative A. This is because it calls for more closures to mineral materials but is less protective of energy and mineral development than Alternatives B, C, E, and F.

Because it calls for more closures, Alternative D would be more protective of water resources than Alternatives A and E from potential impacts of livestock grazing and travel management. However, it would be less protective of water resources from ROW authorizations and associated development and energy and mineral development than under Alternatives B, C, D, and E.

Alternative E

Alternative E would manage of the fewest ROW exclusion areas. It would be less protective of water resources from the potential effects of ROW authorizations and associated development than Alternatives B, C, and F. The effects on water resources from ROW authorizations under Alternative E are similar to those under Alternatives A and D.

Alternative E would be less protective of water resources from the potential effects of livestock grazing than Alternatives B, C, and F. It calls for the same number of closures as Alternatives A and D. The effects on water resources from livestock grazing under Alternative E are similar to those under Alternatives A and D. Alternative E would restrict more acres to existing roads and trails for cross-country travel as Alternative A but fewer acres than Alternatives B, C, D, and F. Energy and mineral development under Alternative E would be managed the same as under Alternative B. As a result, the cumulative impacts from past, present, and reasonably foreseeable actions

would be reduced, compared to Alternative A, but to a lesser extent than under the other action alternatives.

Alternative F

Alternative F would have the same number of acres managed as ROW avoidance and exclusion areas as Alternative C. Alternative F would manage the same number of acres as limited to existing roads and trails as Alternatives B and D. This is more than Alternatives A and E and less than Alternative C. Alternative F would manage more acres as closed to livestock grazing as Alternatives A, B, D and E and fewer acres than Alternative C. Alternative F would manage the largest category of acreage as closed to fluid mineral leasing and the second largest number of acres closed under nonenergy solid leasables, locatables, and mineral material sales.

Alternative F would be less restrictive of surface-disturbing activities than Alternative C, but it would be more restrictive than Alternatives A, B, D, and E. Alternative F could restrict the ROW and mineral developments in **Table 5-23**.

Proposed Plan

The Proposed Action would manage energy and mineral development with a 3 percent disturbance cap (no more than 1 percent each decade for three decades), which would result in more protection for water resources than Alternatives C, E, and F once the cap is reached.

Cumulative impacts from the Proposed Plan are similar to those described for Alternatives A, B, and C. The Proposed Plan would manage 12,292,000 acres as open to livestock grazing, which is approximately 20,000 acres more than Alternative A, and would emphasize the SRH parameters. Livestock grazing would be managed similarly to Alternative B. The Proposed Action would manage 1,203,000 acres as open to cross-county motorized travel, 367,000 acres as closed to cross-country travel, and 11,043,000 acres as limited to existing routes; this is most similar to Alternative C. The Proposed Action would manage similar acres as ROW avoidance as Alternative A but would manage 6,469,000 acres more as avoidance areas. The Proposed Action would manage locatable mineral entry as more restrictive than Alternatives A and D and less restrictive than Alternatives B, C, E, and F. The Proposed Action would manage mineral materials as less restrictive than Alternative C and similar to Alternatives B, D, E, and F. Nonenergy leasables would be managed the same as Alternative B and fluid minerals as less restrictive than Alternatives B, C, and F.

5.21 LANDS WITH WILDERNESS CHARACTERISTICS

Past, present, and reasonably foreseeable actions and conditions in the cumulative impact analysis area that have affected and will likely continue to affect lands with wilderness characteristics are wildland fires, wildland fire management, energy development, mining, nonnative plant invasion, increased recreation demand, livestock grazing, ROWs, and road construction. Continued travel management and recreation development in the planning area could

increase visitor use on BLM-administered lands. This includes lands with wilderness characteristics and could affect wilderness characteristics if it were to reduce the opportunities for solitude.

Development of energy and minerals resources could introduce sights, noises, and infrastructure in or next to lands with wilderness characteristics, which could impair the feeling of solitude and degrade naturalness.

In addition, vegetation management on public and private lands could alter landscape appearance and setting in the short and long term, protecting or degrading wilderness characteristics, depending on the activity.

Cumulative impacts on lands with wilderness characteristics would be mitigated where management actions governing other resources threaten wilderness characteristics.

Alternatives Analysis

Cumulative impacts would be most likely to damage lands with wilderness characteristics under Alternative A. This is because the fewest restrictions on present and future resource uses are in place under this alternative. Management under the action alternatives and the Proposed Plan would protect wilderness characteristics to some degree by placing restrictions on development and land uses. Such restrictions would indirectly limit cumulative impacts on wilderness characteristics. Alternatives C and F place broader and more stringent restrictions on allowable uses of resources in GRSG habitat; consequently, they would provide more indirect protections to lands with wilderness characteristics and would be less likely to have cumulative impacts that would degrade those characteristics.

5.22 SOCIAL AND ECONOMIC CONDITIONS (INCLUDING ENVIRONMENTAL JUSTICE)

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect social and economic conditions are chiefly mining and mineral exploration and development, lands, realty, transportation, ROWs, renewable energy development, recreation, and livestock grazing.

The cumulative impact analysis area used to analyze potential impacts on social and economic conditions consists of the counties identified as the Socioeconomic Study Area.

Changes to social and economic conditions result when individuals, businesses, governments, and other organizations initiate actions. Over the next several decades, millions of decisions will be made by thousands of residents of the counties in the Socioeconomic Study Area and others. These decisions will affect trends in employment, income, housing, and property. Projections published by the Oregon Employment Department and the Oregon Office of

Economic Analysis account for these individual decisions in the aggregate and provide a baseline for comparing effects of alternatives in the future.

The projections represent a regional forecast and take a range of actions into account: management actions by the BLM as well as many other government entities, private citizens, and businesses. As a result, they incorporate the past, present, and reasonably foreseeable projects that will form the basis of future economic and social trends in the cumulative impact analysis area.

Current and future trends in the cumulative impact analysis area include the following:

- Population growth
- Demographic change
- Changes in supply, demand, and policy related to livestock grazing and other forms of agriculture
- Changes in recreation demands
- Renewable energy development
- Potential mining activity, including for gold, uranium, and salable minerals

Some of the predicted employment and income effects of the actions considered in this EIS could be quantified. For the agriculture sector, the BLM used IMPLAN, a regional economic model, to calculate indirect and induced impacts of these actions. **Table 5-24** shows projected employment for 2020 in the seven counties of the primary Study Area, as forecast by the State of Oregon.

Because Alternative A represents current management plans, employment would correspond most closely to the existing forecasts. Employment under Alternatives C and F, especially, would change from the projections, with the best estimate for those changes being the quantities shown in Chapter 4, Environmental Consequences. Thus, **Table 5-24** shows the estimated change in employment for these alternatives, based on modifying the projected future employment by the estimated changes for the Socioeconomic Study Area (from IMPLAN).

Changes in employment, especially under Alternatives C and F, would have a measurable effect on future employment, according to this analysis. Employment changes related to livestock grazing (including sectors that support and are supported by grazing), wind and geothermal development represent the only sectors that could be quantified for this analysis.

Table 5-24
Projected Employment by Alternative for Primary Socioeconomic Study Area

Item	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Proposed Plan
Employment (2010) ¹	42,147	42,147	42,147	42,147	42,147	42,147	42,147
Average annual change in future employment related to grazing ²	N/A	0	-1,062	-3	0	-377	-1
Average annual change in future employment related to wind energy development ³	N/A	-60	-60	0	0	-60	-60
Average annual change in future employment related to geothermal development ³	N/A	-80	-176	0	-80	-176	-83
Projected 2020 employment ⁴	46,877	46,737	45,579	46,874	46,797	46,264	46,733
Percent change, 2010 to 2020	11.2%	10.9%	8.1%	11.2%	11.0%	9.8%	10.9%

Source: Oregon Employment Department (2012) (current and projected employment data), modified by estimates from IMPLAN reported in Section 4.20, Social and Economic Impacts (Including Environmental Justice). Annual changes shown include direct, indirect, and induced effects from IMPLAN; see Appendix R, Economic Impact Analysis Methodology, for a detailed description of this model.

¹The source of 2010 employment data used in this table differs from that used in Section 3.21, Social and Economic Conditions (Including Environmental Justice). The Oregon Employment Department data was chosen for this table because of the availability of projections. However, the data do not include proprietor's employment and tend to be considerably less than the data used in Section 3.21.

²The values for livestock grazing represent the midpoint of the low and high scenarios described in Section 4.8.

³The values for wind energy and geothermal development include operation and construction jobs, assumed to be spread out over a 10-year construction period (e.g., 600 construction jobs in an alternative would mean about 60 construction jobs per year on average). Because construction is assumed to be distributed over a 10 year period, the average annual operations jobs would be half of estimated operations jobs when full capacity is installed.

⁴Where the underlying data sources do not provide county-level employment projections, they were imputed based on the county shares of current employment.

Under Alternatives A, B, D, E, and the Proposed Plan, employment would increase by about 11 percent. Under Alternatives C and F, employment would be projected to increase by 8.1 percent and 9.8 percent, respectively. These smaller increase in earnings under Alternatives C and F would be noticeable, but they would also be relatively small, given the size of the study area and the uncertainty inherent in long-term forecasting.

Table 5-25 shows projected changes in earnings, which parallel the projected changes in employment. **Table 5-25** shows that Alternatives C and D would have a measurable although relatively small effect on future regional earnings.

Table 5-25
Projected Earnings by Alternative for Primary Socioeconomic Study Area

Item	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Proposed Plan
Earnings in 2010 ¹	\$3,294	\$3,294	\$3,294	\$3,294	\$3,294	\$3,294	\$3,294
Average annual change in future earnings related to grazing ²	N/A	\$0	-\$34	-\$0.09	\$0	-\$12	-\$0.03
Average annual change in future earnings related to wind energy development ³	N/A	-\$3	-\$3	\$0	\$0	-\$3	-\$3
Average annual change in future earnings related to geothermal development ³	N/A	-\$4	-\$8	\$0	-\$4	-\$8	-\$4
Projected 2020 earnings ⁴	\$5,249	\$5,242	\$5,204	\$5,249	\$5,245	\$5,226	\$5,242
Percent change, 2010 to 2020	59.4%	59.1%	58.0%	59.3%	59.2%	58.7%	59.1%

Note: All dollar figures are in millions of year 2010 dollars.

Source: Oregon Office of Economic Analysis (2013; current and projected earnings data), modified by estimates from IMPLAN reported in Section 4.20, Social and Economic Impacts (Including Environmental Justice). Annual changes shown include direct, indirect, and induced effects from IMPLAN; see Appendix R, Economic Impact Analysis Methodology, for a detailed description of this model.

¹T As in the case of Table 5-2, the source of employment data in this table is the Oregon Employment Department.

²The values for livestock grazing represent the midpoint of the low and high scenarios described in Section 4.20, Social and Economic Impacts (Including Environmental Justice).

³The values for wind energy development and geothermal development include operation and construction earnings, assumed to be spread out over a 10-year construction period. Because construction is assumed to be distributed over a 10 year period, the average annual operations earnings would half of estimated operations earnings when full capacity is installed.

⁴Where the underlying data sources do not provide county-level projections, they were imputed based on the county shares of current earnings.

Changes related to livestock grazing (including sectors that support and are supported by grazing), wind energy development, and geothermal development are the only sectors that could be quantified for the earnings analysis.

The analysis indicated that under Alternatives A, B, D, E, and the Proposed Plan, earnings would increase by a little over 59 percent. Under Alternatives C and F, earnings would increase by 58.0 percent and 58.7 percent, respectively. Here too, the lower increase in earnings would likely not be noticeable, given the size of the study area and the uncertainty associated with a long-term forecast.

Of the effects documented in **Section 4.20**, the impact that most exacerbates current economic challenges is the potential for several of the management alternatives—especially Alternatives C and F—to increase costs for livestock grazing operators. Long-term trends, including changing market conditions, consolidation supported by economies of scale, demographic change, and environmental concerns, have increasingly challenged economic conditions for ranch operators, especially smaller operators.

Increased costs due to restrictions on vegetation treatments, infrastructure improvements, and other management elements could exacerbate existing trends. Increased costs also can create additional cumulative impacts for the livestock grazing and ranching sector. This in turn could have economic impacts over and above those identified in the employment and earnings projections shown. It could also result in social impacts since the grazing and ranching industry has been quite influential in terms of establishing community character, identity, and social values across the region.

In this way, all of the alternatives would have some degree of cumulative social and economic impact related to grazing. Although AUMs would be reduced only under Alternatives C, D, F, and to a lesser degree under the Proposed Plan, Alternatives B and E would also entail changes to management that could increase costs or decrease the flexibility of ranchers to manage their animals.

In terms of geographic regions, the cumulative effects on livestock grazing operators would occur throughout the Socioeconomic Study Area, but would be most important in Harney, Lake, and Malheur Counties. **Section 4.20** provides additional information to characterize geographic differences as well as the potential for disproportionate impacts on low-income and minority populations.

Impacts on wind energy development and geothermal development would also have economic consequences for the Study Area, especially under Alternatives B, C, F, and the Proposed Plan. However, under all alternatives, exclusion and avoidance areas could have some impact on wind energy development, although economic consequences are less likely under Alternatives A and E for wind energy and under Alternative A for geothermal. Alternatives B, C, D, E, F, and the Proposed Plan could all impose increased costs to future wind energy or geothermal developers. This would result from routing transmission lines and access roads to avoid GRSG-occupied habitat and through mitigation measures. These increased costs could deter some future investments.

The other effect identified in **Section 4.20** that could lead to a cumulatively considerable contribution to impacts is potential fiscal effects. This would be especially the case in the smaller counties that are also more dependent on economic activities on BLM-administered lands. Because specific impacts on local government tax revenues could not be quantified, the nature of the potential cumulative effect is not possible to characterize beyond the analysis in

Section 4.20. That analysis notes specific counties in which local tax revenues could be most affected by the management alternatives.

Alternatives B, D, F and the Proposed Plan include a 3 percent disturbance cap on PHMA, independent of surface ownership. If this disturbance cap is reached, economic activity on BLM lands could be curtailed further than what is described above or in Chapter 4. Soft and hard triggers of the adaptive management plan included in all management alternatives, except for Alternatives A and E, could also lead to additional measures to protect sage-grouse habitat. To the extent that activities on private or state lands contribute to reaching the disturbance cap or reaching soft and hard triggers of the adaptive management plan, the cap and the adaptive management plan enhance the potential for cumulative effects.

Chapter 6

Consultation and Coordination

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CHAPTER 6

CONSULTATION AND COORDINATION

6.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

Changes to this chapter between the Draft EIS and Final EIS are as follows:

- Expanded discussion of Native American and cooperating agency coordination;
- Added discussion of public comment period and summary of public comments;
- Updated, as appropriate, based on public comments received on the DEIS.

6.2 INTRODUCTION

This chapter describes the public outreach and participation opportunities made available through the development of this RMPA/EIS and consultation and coordination efforts with tribes, government agencies, and other stakeholders. This chapter also lists the interdisciplinary team of staff who prepared the RMPA/EIS.

The BLM land use planning activities are conducted in accordance with requirements of the NEPA, CEQ regulations, and BLM policies and procedures implementing NEPA. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process to develop a reasonable range of alternatives to proposed actions and to prepare environmental documents that disclose the potential impacts of proposed actions and alternatives. Public involvement and agency consultation and coordination, which have been at the heart of the planning process leading to this draft RMPA/EIS, were achieved through *Federal Register* notices, public and informal meetings, individual contacts, media releases, and the Greater Sage-Grouse Planning Strategy project website (<http://www.blm.gov/wo/st/en/prog/more/sagegrouse/western.html>).

6.3 CONSULTATION AND COORDINATION

Federal laws require the lead agency to consult with certain federal and state agencies and entities and Native American tribes (40 CFR, Part 1502.25) during the NEPA decision-making process. Federal agencies are also directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays (40 CFR, Part 1500.4-5).

In addition to formal scoping (**Section 6.5.1**, Scoping Process), the BLM implemented an extensive collaborative outreach and public involvement process that has included coordinating with cooperating agencies, holding public scoping meetings, conducting a socioeconomic workshop, and holding seven public comment meetings following publication of the DEIS. The BLM continued to meet with interested agencies and organizations throughout the planning process, as appropriate, and also continued coordinating closely with cooperating partners.

6.3.1 Native American Tribal Consultation

The BLM began tribal consultation by requesting a meeting with area tribes to discuss the details of the GRSg planning efforts. The BLM State Director initiated the consultation in a letter in the fall of 2011. The Director followed up this letter to the tribes during the following time frames:

- Summer 2012, expressing interest in meeting with tribes and initiating government-to-government consultation
- Summer 2013, an update on the planning process and initiating government-to-government consultation
- Fall/winter 2014, expressing interest in meeting with tribal representatives to discuss the draft Proposed Plan

In addition to sending the letters, BLM Vale District staff held meetings with the Fort McDermitt Paiute Tribe in 2014; on February 10, 2015, the BLM Prineville District Manager and GRSg project staff met with the Confederated Tribes of the Warm Springs.

Each of the tribes was also invited to participate in planning as cooperating agencies. The list of tribes contacted is detailed in **Table 6-1**, Cooperating Agencies.

6.3.2 Oregon State Historic Preservation Officer Consultation

The draft RMPA/EIS was provided to the Oregon State Historic Preservation Offices (SHPO) concurrently with its release to the public. The Proposed Plan RMPA/FEIS will also be provided the SHPO.

6.3.3 US Fish and Wildlife Service Consultation

Consultation with USFWS is required under Section 7(c) of the ESA prior to initiation of any project by the BLM that may affect any federally listed or

endangered species or its habitat. This RMPA process is considered to be a major project, and the Proposed RMPA/Final EIS defines potential impacts on threatened and endangered species as a result of management actions proposed in the alternatives. The USFWS is a cooperating agency in this planning process, and USFWS staff has participated in interdisciplinary team meetings and has been provided drafts of alternative decisions and analyses for discussion and input.

On October 22, 2013, the BLM sent a letter to the USFWS listing the species the BLM intended to assess. The USFWS response letter dated November 13, 2013 confirmed this list and recommended adding North American wolverine, Yellow-billed cuckoo, and Columbia spotted frog to the biological assessment. Over the ensuing months, regular meetings and coordination efforts were held to address which actions could affect those species and determine whether the implementation of the Proposed Plan “may affect” the species.

In May 2015, the BLM notified the USFWS it had completed the biological assessment (**Appendix W**, Biological Assessment Summary), with the determination of “no effects” to Federally listed and proposed species and designated and proposed critical habitat.

6.4 COOPERATING AGENCIES

A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with a lead federal agency to help develop an environmental analysis. More specifically, cooperating agencies “work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks” (BLM 2005d).

On December 7, 2011, the BLM wrote to 35 local, state, federal, and tribal representatives, inviting them to participate as cooperating agencies for the Oregon Greater Sage-Grouse Sub-Region RMPA/EIS. Twelve agencies agreed to participate on the EIS as designated cooperating agencies, all of which have signed MOUs with the BLM (**Table 6-1**, Cooperating Agencies). Some agencies are participating as cooperating agencies under the larger umbrella of the national-level MOUs described below.

The Forest Service, USFWS, and NRCS are participating in the EIS process as cooperating agencies at a national, regional, and sub-regional level; all agencies have signed MOUs, which outline roles and responsibilities at each organizational level.

**Table 6-1
Cooperating Agencies**

Agencies and Tribes Invited to be Cooperators	Agencies that Accepted	Agencies that Signed MOUs
Counties		
Baker County		
Crook County	X	X
Deschutes County	X	X
Gillam County		
Grant County		
Harney County	X	X
Jefferson County		
Klamath County		
Lake County	X	X
Malheur County	X	X
Morrow County		
Sherman County		
Umatilla County		
Union County		
Wallowa County		
Wasco County		
State Agencies		
Governor's Natural Resources Office		
Oregon Department of Agriculture		
Oregon Department of Economic Development		
Oregon Department of Energy		
Oregon Department of Environmental Quality		
Oregon Department of Fish and Wildlife	X	X
Oregon Department of Forestry		
Oregon Department of Geology and Mineral Industries		
Oregon Department of Land Conservation/Development		
Oregon Department of Transportation		
Oregon Division of State Lands		
Oregon Water Science Center		
Oregon State Parks and Recreation Department		
Oregon State University	X	X
Federal Agencies		
Bureau of Reclamation		
Federal Energy Regulatory Commission	X	X
Federal Highway Administration		
Natural Resources Conservation Service	X	X
US Army Corps of Engineers		

**Table 6-1
Cooperating Agencies**

Agencies and Tribes Invited to be Cooperators	Agencies that Accepted	Agencies that Signed MOUs
US Attorney's Office		
USDA Animal and Plant Health Inspection Service		
USDA Rural Development		
US Environmental Protection Agency		
US Fish and Wildlife Service	X	X
US Forest Service	X	X
Tribes		
Burns Paiute Tribe		
Confederated Tribes of the Warm Springs		
Modoc Tribe of Oklahoma		
Confederated Tribes of the Colville Reservation		
Shoshone-Bannock Tribes of Fort Hall		
Fort McDermitt Paiute Tribe		
Nez Perce Tribe		
Shoshone-Paiute Tribes of Duck Valley		
Confederated Tribes of the Umatilla Indian Reservation		
Fort Bidwell Indian Community		
Klamath Tribes		
Other		
Harney Soil and Water Conservation District	X	X

Since starting on May 18, 2012, and throughout the planning process, the BLM has conducted numerous meetings with cooperating agencies. Cooperating agencies were also encouraged to attend the scoping open houses and to provide comments during the scoping period and public comment meetings for the draft EIS in January 2014. These agencies have been engaged throughout the planning process, including during development of the alternatives and the Proposed Plan.

Examples of cooperating agency involvement throughout this planning process are as follows:

- Crook, Deschutes, Harney, Lake, and Malheur Counties participated as cooperating agencies throughout the planning process. The counties' areas of expertise are social and economic values and impacts.
- The Harney Soil and Water Conservation District requested cooperating agency status. Their area of expertise is agricultural interests, livestock grazing, and rangeland vegetation.

- The BLM held several informal meetings with Forest Service representatives throughout the planning process. While the Forest Service was not directly involved, the two agencies shared data, where appropriate, to further their respective planning efforts.
- Biologists from the ODFW and USFWS were members of the interdisciplinary team, with special expertise in GRSB biology and management. These team members also were conduits of information to colleagues and leaders of each agency.
- A management oversight team (MOT) met occasionally to provide direction to the interdisciplinary team. The MOT is composed of federal and state decision-makers. Monthly meetings were held early in the process, with meetings becoming less frequent following publication of the DEIS.

In addition, several major meetings were held as listening sessions after the DEIS was released, during development of the Proposed Plan, as follows:

- January 30, 2014, Prineville—IDT, DSD, Mike Haske (BLM Deputy State Director, Resource Planning, Use, and Protection) in attendance; all cooperating agencies were invited
- March 25, 2014, Burns—Harney SWCD and Harney County in attendance
- April 7 through 10, 2014, Bend—IDT, BLM Branch Chief Sally Sovey, and Harney SWCD in attendance; county cooperators were invited

The BLM is aware that there are specific State laws and local plans relevant to aspects of public land management that are discrete from, and independent of, Federal law. However, BLM is bound by Federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA and its implementing regulations require that BLM's land use plans be consistent with State and local plans only if those plans are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. Where State and local plans conflict with the purposes, policies, and programs of Federal law there will be an inconsistency that cannot be resolved. While County and Federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the Federal agency planning process is not bound by or subject to County plans, planning processes, or planning stipulations.

6.5 PUBLIC INVOLVEMENT

Public involvement is a vital and legal component of both the RMPA and EIS processes. Public involvement invests the public in the decision-making process and allows for full environmental disclosure. Guidance for implementing public involvement under NEPA is codified in 40 CFR, Part 1506.6, thereby ensuring

that federal agencies make a diligent effort to involve the public in the NEPA process. Section 202 of the FLPMA directs the Secretary of the Interior to establish procedures for public involvement during land use planning actions on BLM-administered lands. These procedures can be found in the BLM's Land Use Planning Handbook H-1601-1 (BLM 2005d).

Public involvement for the Oregon Greater Sage-Grouse Sub-Region RMPA/EIS is as follows:

- Public scoping before beginning NEPA analysis to determine the scope of issues and alternatives to be addressed in the RMPA/EIS
- Public outreach via newsletters and press releases throughout the RMPA/EIS process
- Collaboration with federal, state, local, and tribal governments and cooperating agencies throughout the RMPA/EIS process
- Public review and comment on the draft RMPA/EIS
- Public review and protest period on the final RMPA/EIS

6.5.1 Scoping Process

The formal public scoping process for the Oregon Greater Sage-Grouse Sub-Region RMPA/EIS began on December 9, 2011, with the publication of the notice of intent in the *Federal Register* (76, 77008-77011). The notice of intent notified the public of the BLM's intent to prepare EISs and supplemental EISs to incorporate GRSG conservation measures into LUPs; it also initiated the public scoping period. A notice of correction to the notice of intent was released on February 10, 2012 (77 *Federal Register* 7178-7179). The notice of correction extended the scoping period until March 23, 2012.

Project Website

The BLM launched a national GRSG conservation website as part of its efforts to maintain and restore GRSG habitat on public lands. The national website is <http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html>. The BLM has also launched a Great Basin regional website: <http://www.blm.gov/wo/st/en/prog/more/sagegrouse/western.html>. These sites are regularly updated to provide the public with the latest information about the planning process. The Great Basin website provides background information about the project, a public involvement timeline, maps of the planning areas, and copies of public information documents and notice of intent. The dates and locations of scoping open houses were also announced on the Great Basin website.

Press Release

A press release was made available on the national and Great Basin region websites on December 8, 2011, announcing the scoping period for the EIS process. The Oregon BLM State Offices also distributed a press release on January 10, 2012, announcing the scoping period for the EIS process. The press

release provided information on the scoping open houses being held and described the various methods for submitting comments. A second press release was posted on the national and Great Basin websites on February 7, 2012, announcing the extension of the public scoping period to March 23, 2012. A third press release was issued on the national and Great Basin websites on February 9, 2012, announcing the addition of National Forests to the GRSG planning efforts (not applicable to Oregon).

Public Scoping Open House

The BLM hosted five open houses to provide the public with an opportunity to become involved, learn about the project and the planning process, meet the planning team members, and offer comments. The scoping meetings were held in an open house format to encourage participants to discuss concerns and questions with the BLM and other agency staff representatives. The location and date of the open houses were as follows:

- Lakeview, Oregon—January 17, 2012
- Ontario, Oregon—January 23, 2012
- Baker City, Oregon—January 24, 2012
- Burns, Oregon—January 25, 2012
- Prineville, Oregon—January 26, 2012

Scoping Comments Received

Detailed information about the comments received can be found in the National Greater Sage-Grouse Planning Strategy Scoping Summary Report, finalized in May 2012 (BLM and Forest Service 2012). A total of 585 unique written submissions were received for the Great Basin region. Of these, 169 were specific to Oregon. The issues that were identified during public scoping and outreach are described in **Section 1.6.2, Issues Identified for Consideration** in the Oregon Sub-Region Greater Sage-Grouse RMP Amendments, of this RMPA/EIS. These issues guided the development of alternative management strategies outlined in **Chapter 2** of this RMPA/EIS.

6.5.2 Public Comment on the Draft RMPA/EIS

Public participation is ongoing throughout the RMPA/EIS process. One substantial part of this effort was the opportunity for members of the public to comment on the draft RMPA/EIS during the comment period. In the proposed RMPA/Final EIS, the BLM responded to all substantive comments received during the 90-day comment period. The agency will issue a ROD after the release of the proposed RMPA/Final EIS, the Governor's consistency review, and any resolution of protests received on the proposed RMPA/Final EIS.

Public Meetings

A notice of availability (NOA) for the Draft RMPA/EIS was published in the *Federal Register* on November 26, 2013. This initiated a 90-day public comment

period. The BLM notified the public of open house meetings via the project website and a news release to 33 newspapers and radio and television stations.

The BLM held seven public comment open houses in Oregon for the Draft RMPA/EIS from January 6 to January 23, 2014, as follows:

- Prineville, Oregon—January 6, 2014
- Burns, Oregon—January 7, 2014
- Ontario, Oregon—January 8, 2014
- Baker City, Oregon—January 9, 2014
- Lakeview, Oregon—January 13, 2014
- Jordan Valley, Oregon—January 22, 2014
- Durkee, Oregon—January 23, 2014

All meetings were held from 5:30 to 7:30 p.m. The goal was to inform the public about the Draft RMPA/EIS and to obtain further input on the alternatives that were developed and analyzed. In addition, the BLM sought comments on potential impacts resulting from the six alternatives.

At the open houses, displays introduced the various resource topics and presented the six alternatives for the resource topics. Other displays explained the NEPA process and the methods for submitting comments. A slide show looped throughout the open house describing the Oregon Sub-Region Greater Sage-Grouse Draft RMPA/EIS preparation process.

Public comments were solicited at the open houses, and comment sheets were provided.

Comment Analysis Method

After publishing the Draft RMPA/EIS, the BLM held a 90-day public comment period to receive comments on the Draft RMPA/EIS. The BLM received written comments by mail, e-mail, and in person at the public meetings. Comments covered a wide spectrum of thoughts, opinions, ideas, and concerns. The BLM recognizes that commenters invested considerable time and effort to submit comments on the Draft RMPA/EIS. The agency developed a comment analysis method to ensure that all comments were considered as directed by NEPA regulations.

According to NEPA, the BLM is required to identify and formally respond to all substantive public comments. It developed a systematic response process to ensure all substantive comments were tracked and considered. On receipt, each comment letter was assigned an identification number and logged into CommentWorks, an Internet database that allowed the BLM to organize, categorize, and respond to comments.

Substantive comments from each letter writer were coded to appropriate categories, based on the content of the comment; the link to the commenter was retained. These categories generally follow the sections presented in the Draft RMPA/EIS, though some relate to the planning process or editorial concerns.

Similar comments were grouped under a topic heading, and the BLM drafted a statement summarizing the ideas contained in the comments.

A response to a comment indicated whether the commenter's point or points resulted in a change to the Draft RMPA/DEIS. A summary of major changes between the Draft RMPA/EIS and the Proposed RMPA/FEIS can be found at the beginning of each chapter.

Although each comment letter was diligently considered, the comment analysis process involved determining whether a comment was substantive or not. In performing this analysis, the BLM relied on the CEQ's regulations to determine what constituted a substantive comment.

A substantive comment does one or more of the following:

- Questions, with a reasonable basis, the accuracy and adequacy of the information and analysis in the EIS
- Presents reasonable alternatives other than those in the draft EIS that meet the purpose and need of the proposed action and address significant issues
- Questions, with a reasonable basis, the merits of an alternative or alternatives
- Causes changes in or revisions to the proposed action
- Questions, with a reasonable basis, the adequacy of the planning process itself

Additionally, the BLM's NEPA handbook identifies the following types of substantive comments:

- Comments on the adequacy of the analysis—Comments that express a professional disagreement with the conclusions of the analysis or assert that the analysis is inadequate are substantive but may or may not lead to changes in the Final EIS. Interpretations of the analyses should be based on professional expertise. Where there is disagreement within a professional discipline, a careful review of the various interpretations is warranted. In some cases, public comments may necessitate a reevaluation of analytical conclusions. If, after reevaluation, the authorized officer responsible

for preparing the EIS does not think that a change is warranted, the officer should provide the rationale for that conclusion.

- Comments that identify new impacts, alternatives, or mitigation measures—Public comments on a Draft EIS that identify impacts, alternatives, or mitigation measures that were not addressed in the draft are substantive. This type of comment requires the authorized officer to determine whether it warrants further consideration. If so, the authorized officer must determine whether the new impacts, alternatives, or mitigation measures should be analyzed in the Final EIS, a supplement to the Draft EIS, or a completely revised and recirculated Draft EIS.
- Disagreements with significance determinations—Comments that directly or indirectly question, with a reasonable basis, determinations regarding the significance or severity of impacts are substantive. A reevaluation of these determinations may be warranted and may lead to changes in the Final EIS. If, after reevaluation, the authorized officer does not think that a change is warranted, the response should provide the rationale for that conclusion.

Some submissions contained substantive comments but were outside the scope of this project. These included comments on subjects not related to the project, other GRSR projects, or BLM laws, rules, regulations, or policy. The BLM reviewed these comments and sent them along to the appropriate party as needed; however, they are not included in the comment response for this project.

Comments that failed to meet the above description were considered non-substantive. Many comments received throughout the process were categorized as follows:

- Expressed personal opinions or preferences
- Had little relevance to the adequacy or accuracy of the Draft RMPA/EIS
- Represented commentary regarding resource management without any real connection to the document being reviewed

These commenters did not provide specific information to assist the planning team in making a change to the Preferred Alternative, did not suggest other alternatives, and did not take issue with methods used in the Draft RMPA/EIS; as such, they are not addressed further in this document.

Examples of these comments are the following:

- “The best of the alternatives is Alternative D [or A, B, or C].”

- “The BLM has yet to show land stewardship at or above the level currently demonstrated by the private sector.”
- “Your plan does not reflect balanced land management.”
- “Stop giving away land to the mineral companies.”
- “More land should be protected as wilderness.”
- “I want the EIS to reflect the following for this area: no grazing, no logging, no drilling, no mining, and no OHVs.”
- “You need to protect all ACECs/Wild and Scenic Rivers/areas with wilderness characteristics.”
- “Do not add any more road closures to what is now in existence.”
- “People need access and the roads provide revenue for local communities.”
- “More areas should be made available for multiple uses (drilling, OHVs, ROWs, etc.) without severe restrictions.”

Opinions, feelings, and preferences for one element or one alternative over another and comments of a personal or philosophical nature were all read, analyzed, and considered; however, because such comments were not substantive, the BLM did not respond to them.

It is also important to note that, while all comments were reviewed and considered, comments were not counted as “votes.” The NEPA public comment period is neither an election nor does it result in a representative sampling of the population. Therefore, public comments are not appropriate to be used as a democratic decision-making tool or as a scientific sampling mechanism.

Comments providing editorial corrections to the document were reviewed and incorporated. The Final RMPA/EIS has been extensively technically edited and revised to fix typographical errors, missing references, definitions, and acronyms, and other clarifications as needed.

Public Comments

A total of 642 unique comment letters, forms, and e-mails were received during the 90-day public comment period. These documents resulted in 1,776 substantive comments (see **Table 6-2**, Number of Unique Submissions and Comments by Affiliation).

Table 6-2
Number of Unique Submissions and Comments by Affiliation

Group	Number of Submissions	Number of Comments
Private individuals	516	596
Organizations (including businesses and environmental and wildlife protection groups)	35	390
Associations (for example, user groups, recreational clubs, realty associations, industry groups, and partnerships)	46	335
Federal agencies (EPA, USFWS, USFS, NPS)	2	61
State government (state agencies, Governor's office)	3	155
Local government (county commissions and departments)	32	236
Tribal government	0	0
Anonymous	86	3
Total	642	1,776

In addition to the unique submissions discussed above, 19,504 form letters were submitted during the public comment period. Form letters are exact or very close copies of a letter and are submitted multiple times by different individuals. They may add additional language to the letter, but this usually does not substantially change the content of the letter. Often, form letters are created by an organization and sent to their members, who in turn submit this letter to the planning effort.

For the Oregon Draft RMPA/EIS, 11 different form letter masters were submitted, as follows:

- 2,916 from WildEarth Guardians
- 156 from the Oregon Natural Desert Association
- 2,676 from the American Bird Conservancy
- 2,988 from Defenders of Wildlife
- 8,733 from the American Wild Horse Preservation Campaign
- 1,932 from the Center for Biological Diversity
- 16 from the Harney Electric Cooperative
- 57 from Farm Beef Cattleman
- 7 from the Union County Cattlemen
- 18 from an unknown ranching organization
- 5 from an unknown organization or association

One copy of each of these letters was included in the comment analysis process as a master form letter. All of the form letters were reviewed for additional substantive content, which was included in the comment analysis process.

Table 6-3, Number of Comments on the Draft RMPA/EIS by Category, displays the number and percentage of substantive comments received by resource topic. Comments suggesting editorial changes or requesting a comment period extension or those that were considered outside the scope of this project were reviewed and considered; however, they were not included in the formal comment responses.

Table 6-3
Number of Comments on the Draft RMPA/EIS by Category

Topic	Number of Comments	Percent of Total Comments
GRSG	218	12.3
NEPA	171	9.6
Livestock grazing	113	6.4
Socioeconomics	156	8.8
Vegetation—sagebrush	83	4.7
Other laws	8	0.5
FLPMA	21	1.2
Locatable minerals	25	1.4
Predation	57	3.2
Leasable minerals	11	0.6
Lands and realty	55	3.1
Fire and fuels	74	4.2
Wild horses and burros	16	0.9
Travel management	66	3.7
Vegetation—riparian	14	0.8
Water resources	13	0.7
Recreation	7	0.4
Climate change	7	0.4
Noise	3	0.2
Tribal interests	2	0.1
Fish and wildlife	4	0.2
Lands with wilderness characteristics	6	0.3
Soil resources	5	0.3
ACECs	23	1.3
Salable minerals	3	0.2
Cultural resources	2	0.1
Noxious and invasive weeds	24	1.4
Edits*	89	5.0
Out of scope*	484	27.3
Extension requests*	16	0.9
Total	1,776	100.0

*Comments in these categories were reviewed for their content but were not included in the comment responses.

The comments received on the Draft RMPA/EIS were similar to the issues raised during public scoping. In many cases, commenters expressed a desire for very specific implementation level (project level) details to be included in the RMPA. As described in Chapters 1 and 2, the RMPA/EIS provides general guidance and identifies allowable uses and allocations, but it is not meant to address all details about individual projects. A separate environmental review will be conducted for specific projects at the implementation level to address these details. Some comments spanned several topical areas and included a discussion about a resource use or activity. They listed concerns about the resources that would be impacted by the use, or conversely, the impact that restrictions would have on resource uses or activities.

All comment summaries and responses organized by resource, resource use, or EIS planning regulation can be found in **Appendix V**, Public Comment Report; an overview of these summaries and responses can be found below in **Table 6-4**, Overview of Comments by Category. Comments related to editorial changes, out of scope topics, and extension requests and non-substantive comments were not included in the comment responses.

Table 6-4
Overview of Comments by Category

Topic	Overview
ACECs	Commenters asserted that a number of proposed RNAs do not meet the criteria and should therefore not be considered; they suggested that certain areas did not have relevance and importance criteria and wanted to see a greater range of alternatives for ACEC locations.
Climate change	Commenters questioned the suitability of GRSG habitat in Mormon Basin and the inconsistencies and lack of information in Chapter 3; they wanted to see more analysis of impacts from grazing and implications for vegetation.
Cultural resources	Commenters requested analysis of grazing on cultural and historic resources.
Fire and fuels	Commenters requested clarification on the potential impacts of the plan on fire conditions; they suggested potential changes to alternatives or management actions.
FLPMA	Commenters claimed that the Draft RMPA/EIS failed to comply with the multiple use mandate required under FLPMA. They also suggested that the plan did not take into account consistency with state, local, and tribal plans and policies.
GRSG	Commenters claimed the NTT report was inadequate to use as a primary source in the plan; found the plan to be inconsistent with COT conservation objectives; requested separate NEPA analysis for WO IM 2012-043 and 2012-044; requested clarification on the range of alternatives and habitat mapping; suggested new or additional literature to be used for best available information on GRSG; made recommendations on how to improve the impact analysis of various resources on GRSG; found the cumulative impacts to be deficient; and requested clarification or revisions to mitigation measures.

Table 6-4
Overview of Comments by Category

Topic	Overview
Lands and realty	Commenters requested additions to the range of alternatives, including information and a full range of management options; suggested the analysis did not fully address impacts on private lands; and said the Draft RMPA/EIS failed to include a comprehensive list of required mitigation measures for ROW development.
Lands with wilderness characteristics	Commenters claimed the BLM did not adhere to current guidance, wanted additional actions to protect wilderness characteristics, and suggested that the analysis of impacts on wilderness characteristics did not account for beneficial and adverse impacts and that it did not analyze areas identified by the public as exhibiting wilderness characteristics.
Leasable minerals	Commenters suggested new management actions, including different buffer distances, additional seasonal restrictions, and other protective measures. They also requested that additional studies and information be considered.
Livestock grazing	Commenters argued that the BLM has no authority to retire or terminate grazing permits; recommended expanding the range of alternatives for livestock grazing; requested clarification on certain grazing terms and management actions; provided additional citations for baseline information and impact analysis; found the analysis of impacts to be inadequate; and requested additional items be added to the cumulative impacts section.
Locatable minerals	Commenters questioned the BLM's authority to manage mining on split-estate; requested habitat mitigation requirements and consistent limitations on surface disturbance; identified inaccuracies regarding the locatable minerals being mined in the planning area; and requested that the Mormon Basin mining project be added to the affected environment and cumulative impact analysis.
NEPA	Commenters asserted that the Proposed Plan does not comply with the requirements of NEPA; does not adequately notify the public about the DEIS; does not coordinate with local agencies; does not provide a wide enough range of alternatives; does not use the best available data; relies on faulty GIS data; and does not provide an adequate cumulative impacts analysis or mitigation measures.
Noise	Commenters suggested that the BLM should correct inconsistencies in sections evaluating the effects of noise on leks and should include new scientific research in the Final EIS.
Other laws	Commenters argued that the BLM failed to document how the EIS and actions considered in the EIS comply with other laws.
Predation	Commenters said the Draft RMPA/EIS failed to adequately address impacts on GRSG from predation.
Recreation	Commenters recommended using seasonal closures and noise regulations, wanted more analysis on the impacts of hunting on GRSG populations, and requested different visitation and expenditure data be used in the Final EIS.
Salable minerals	Commenters said the Draft RMPA/EIS was unclear on how rock quarries on private land would be affected and how closures on public and private land would impact the availability of the material and the cost of maintaining roads.

Table 6-4
Overview of Comments by Category

Topic	Overview
Socioeconomics	Commenters wanted the baseline data revised to include more current and relevant data, claimed the analysis used was at the wrong scale to make the information meaningful, and noted that the direct, indirect, and cumulative impact analysis was inadequate in many ways.
Soil resources	Commenters recommended adding information on biological soil crusts and recommended new references for the impacts of livestock grazing on soil resources.
Special status species	Commenters requested clarification of the disturbance cap and conifer removal actions and requested additional analysis of impacts from removing water developments and increasing wild horse and burro use in riparian habitats.
Travel management	Commenters expressed concern about impacts on new route construction, administrative use, and emergency response; advocated for more or fewer travel restrictions; asserted that the baseline information was inaccurate; questioned the accuracy and adequacy of the impact analysis; and recommended clarification about mitigation measures.
Tribal interests	Commenters requested improved government-to-government consultation with the tribes in the planning area and better analysis of the impacts of climate change, fire, and drought on tribes.
Vegetation—riparian	Commenters requested including tamarisk issues and claimed the cumulative impact analysis needed to better document the beneficial impacts of riparian vegetation communities.
Vegetation—sagebrush	Commenters voiced concern about prioritizing vegetation treatments; requested additional information about actions within the alternatives; said the Draft RMPA/EIS fails to provide adequate baseline information related to invasive species spread and juniper establishment; requested more detailed analysis; and requested additional information on the VDDT model.
Vegetation—weeds	Commenters requested greater analysis of the GRSG wildfire and invasive species habitat assessments, discussion of cooperative weed management agreements, and clarification of methods used to control weeds. Commenters also provided additional literature for review.
Water resources	Commenters noted concerns pertaining to the probability of impacts; requested better information on water quality, water quantity, and water rights; recommended literature to review; and questioned the accuracy of the analysis of impacts on water resources from livestock grazing and vehicle travel.
Wild horses and burros	Commenters suggested the BLM did not consider alternatives that adequately limited or managed wild horses in the planning area; requested greater justification for increasing or decreasing AUMs; requested additional information on the role of HAF in managing wild horses and burros; suggested additional citations be added; requested information on current population levels and whether they exceed AML; and requested additional analysis of the cumulative impacts of removing water developments.
Wilderness and WSAs	Commenters requested additional actions within Wilderness and WSAs to benefit GRSG, such as native seed planting, removal of structures, and changes to recreation management.

Complete responses, including rationales and any associated changes made in the Proposed RMPA/FEIS, can be found in **Appendix V**, Public Comment Report. A brief overview of changes to the document between the DEIS and FEIS is as follows:

- The disturbance cap in the Proposed LRMA/FEIS was revised to provide additional detail, such as enhanced descriptions of what types of activities would count toward the disturbance totals, where disturbance activities would count against the cap, reclamation and habitat requirements for a disturbed area for both temporary and permanent disturbance, and how the cap would be implemented and monitored. **Appendix I**, Disturbance Cap Calculation Method, has also been added to the Proposed RMPA/FEIS and contains a disturbance inventory method to more accurately assess current disturbance levels and potential impacts across the planning area.
- A more comprehensive list of cumulative projects, past and future, has been developed and was used to support a more detailed analysis of cumulative impacts. Cumulative impacts have also been reviewed for consistency with the rest of the plan.
- Additional language has been added describing the adaptive management approach for the RMPA/EIS level.
- Mitigation and monitoring have been further defined as a regional mitigation framework and national monitoring framework, detailed in **Appendices E** and **G**, respectively.
- Management objectives and actions in Chapter 2 have been updated.
- Additional literature was reviewed and added to the baseline information in Chapter 3.
- Chapter 4 has been updated with new information and analysis and was revised for consistency with Chapter 3.
- Clarifications have been added on specific topics that commenters found confusing or poorly described, including implementation-level decisions.
- All comments citing editorial changes to the document were reviewed and incorporated, as appropriate. The Proposed RMPA/FEIS has been edited and revised to fix typographical errors, missing references, definitions, acronyms, calculations, and other inconsistencies.

6.5.3 Future Public Involvement

Public participation will be ongoing throughout the remainder of the RMPA/EIS process.

An NOA will be published in the *Federal Register* to notify the public of the availability of the Proposed RMPA/Final EIS. The NOA will also outline protest procedures during the 30-calendar-day protest period.

The Proposed RMPA/Final EIS will be available for downloading from the project website at <http://www.blm.gov/or/energy/opportunity/sagebrush.php>. It also will be available for review at the BLM Oregon State Office and district offices in Baker, Burns, Lakeview, Prineville, and Vale. Press releases will be issued to notify the public of the Proposed RMPA/Final EIS availability. All recipients of the Draft RMPA/EIS and all parties who submitted written comments on the Draft RMPA/EIS will receive the Proposed RMPA/FEIS in either a hard copy or CD, or they will be able to download it from the website. The BLM will notify those who previously received the Draft RMPA/EIS electronically. The BLM Oregon State Office maintains the distribution list for the Proposed RMPA/FEIS, which is available on request.

The BLM will issue a ROD after the release of the Proposed RMPA/FEIS, the Governor's Consistency Review, and any resolution of protests received on the Proposed RMPA/FEIS.

6.6 LIST OF PREPARERS

This RMPA/EIS was prepared by an interdisciplinary team of staff from the BLM and Environmental Management and Planning Solutions, Inc. (EMPSi; see **Table 6-5**, List of Preparers). In addition, staff from numerous federal, state, and local agencies and nonprofit organizations contributed to developing the RMPA/EIS.

The following is a list of people who prepared or contributed to the development of the RMPA/EIS.

Table 6-5
List of Preparers

Name	Role/Responsibility
BLM Oregon State Office	
Joan Suther	Project Manager
Stewart Allen	Social and Economic Conditions
Claudia Campbell	GIS Specialist
Janet Cheek	Lands and Realty Specialist
Jeanne DeBenedetti Keyes	Lead GIS Specialist
Paul Fyfield	Lead Cartographer
Tim Barnes	Core IDT Lead—Renewable Energy, Mineral Resources
Al Doelker	Core IDT Lead—Riparian and Wetlands, Fisheries and Aquatic Wildlife
Louisa Evers	Core IDT Lead—Vegetation
Charlie Fifield	Core IDT Lead—Rangelands
Glenn Frederick	Core IDT Lead—Special Status Species, Big Game Species
Craig Goodell	Core IDT Lead—Wildland Fire Management

**Table 6-5
List of Preparers**

Name	Role/Responsibility
Cathy Hopper	Records Manager
Robert Hopper	Core IDT Lead—Forest and Woodland, Wild Horses and Burros, Livestock Grazing
Janet Hutchison	Core IDT Lead—Lands and Realty and Renewable Energy
Chris Knauf	Core IDT Lead—Recreation and Travel Management
Maggie Langlas Ward	Core IDT Lead—Special Designations, including Lands with Wilderness Characteristics; NEPA review
Stan McDonald	Core IDT Lead—Cultural Resources and Tribal Interests
Mark Mousseaux	Core IDT Lead—Special Status Plants, ACECs, and RNAs
Jessica Rubado	Environmental Planner
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Chapter 8

Acronyms and Glossary

CHAPTER 8

ACRONYMS AND GLOSSARY

8.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

Changes to this chapter between the Draft EIS and Final EIS are as follows:

- Added or revised approximately 45 glossary terms;
- Reorganized glossary terms; and
- Updated, as appropriate, based on public comments received on the DEIS.

8.2 ACRONYMS

Acronyms and Abbreviations		Full Phrase
ACEC		Area of Critical Environmental Concern
AML		Appropriate Management Level
AMP		allotment management plan
AMS		Analysis of the Management Situation
APA		Administrative Procedure Act
APD		Application for Permit to Drill
AUM		animal unit month
BLM	United States Department of the Interior, Bureau of Land Management	
BMP		best management practice
BSU		Biologically Significant Unit
CCA		candidate conservation agreement
CCAA		candidate conservation agreement with assurances
CEQ		Council on Environmental Quality
CFR		Code of Federal Regulations
COT		Conservation Objectives Team
CSU		controlled surface use

Acronyms and Abbreviations	Full Phrase
EIS	Environmental Impact Statement
EMS	emergency medical service
EPA	United States Environmental Protective Agency
ES&R	emergency stabilization and rehabilitation
ESA	Endangered Species Act of 1973
FFR	Fenced Federal Range
FHWA	Federal Highways Act
FIAT	Fire and Invasives Assessment Tool
FLPMA	Federal Land Policy and Management Act of 1976
Forest Service	United States Department of Agriculture, Forest Service
FPA	Fire Program Analysis
FRCC	fire regime condition class
FWFMP	Federal Wildland Fire Management Policy
GDP	Geothermal Drilling Permit
GH	general habitat
GHMA	general habitat management area
GRSG	Greater Sage-Grouse
HA	Herd Area
HAF	habitat assessment framework
HMA	Herd Management Area
HMAP	Herd Management Area Plan
HMP	Habitat Management Plan
IM	Instruction Memorandum
LG/RM	livestock grazing/range management
LR	lands and realty
LUBA	Land Use Board of Appeals
LUP	Land Use Plan
MLM	locatable minerals
MLS	leasable minerals (federal fluid mineral estate)
MNL	nonenergy leasable minerals
MOU	Memorandum of Understanding
MSE	mineral split estate
MSM	mineral materials (salables)
MZ	Management Zone
NAAQS	National Ambient Air Quality Standards
NAS	National Academy of Sciences
NEPA	National Environmental Policy Act of 1969, as amended
NL	no lease
NRCS	Natural Resources Conservation Service
NSO	no surface occupancy
NTT	National Technical Team

Acronyms and Abbreviations	Full Phrase
OAR	Oregon Administrative Rule
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OHV	off-highway vehicle
OSV	over-snow vehicle
PAC	priority areas for conservation
PECE	Policy for the Evaluation of Conservation Efforts
PFC	proper functioning condition
PGH	preliminary general habitat
PGMA	preliminary general management area
PH	priority habitat
PHMA	preliminary habitat management area
PILT	Payments in Lieu of Taxes
PPH	preliminary priority habitat
PPMA	preliminary priority management area
RC	recreation
RDF	required design feature
REA	Rapid Ecoregional Assessment
RFD	reasonable foreseeable development
RFPA	Rangeland Fire Protection Association
RMIS	Recreation Management Information System
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
RNA	Research Natural Area
ROD	Record of Decision
ROW	right-of-way
SAR	search and rescue
SD	special designations
SFA	sagebrush focal area
SRMA	special recreation management area
SRH	Standards for Rangeland Health
SRP	special recreation permit
SSP	special status plants
SSS	special status species
TL	timing limitation
TM	comprehensive travel and transportation management
TNEB	thriving natural ecological balance
US	United States
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTV	utility vehicle

Acronyms and Abbreviations	Full Phrase
VDDT	Vegetation Dynamics Development Tool
VG	vegetation
WAFWA	Western Association of Fish and Wildlife Agencies
WFM	wildland fire management
WHB	wild horse and burro
WSA	Wilderness Study Area

8.3 GLOSSARY

2008 WAFWA Sage-grouse Memorandum of Understanding (MOU):

A memorandum of understanding (MOU) among Western Association of Fish and Wildlife Agencies (WAFWA); United States (US) Department of Agriculture (USDA), Forest Service (Forest Service); US Department of the Interior (DOI), Bureau of Land Management (BLM); DOI, Fish and Wildlife Service (USFWS); DOI, Geological Survey (USGS); USDA, Natural Resources Conservation Service (NRCS); and the USDA, Farm Service Agency. The purpose of the MOU is to provide for cooperation among the participating state and federal land, wildlife management and science agencies in the conservation and management of Greater Sage-Grouse (*Centrocercus urophasianus*) sagebrush (*Artemisia* spp.) habitats and other sagebrush-dependent wildlife throughout the western US and Canada and serve as a commitment of all agencies to implement the 2006 WAFWA Conservation Strategy.

2011 Partnership Memorandum of Understanding (MOU): A partnership agreement among the NRCS, Forest Service, BLM, and USFWS. 2011. This range management MOU is an agreement to implement NRCS practices on adjacent federal properties.

Acquisition: Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, Land and Water Conservation Fund purchases, donations, or receipts from the Federal Land Transaction Facilitation Act sales or exchanges.

Activity plan: A type of implementation plan (see *Implementation plan*). An activity plan usually describes multiple projects and applies best management practices (BMPs) to meet Land Use Plan (LUP) objectives. Examples of activity plans include interdisciplinary management plans, habitat management plans (HMPs), recreation area management plans, and grazing plans.

Actual use: The amount of animal unit months (AUMs) consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by the BLM.

Adaptive management: A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Additionality: The conservation benefits of compensatory mitigation are demonstrably new and would not have resulted without the compensatory mitigation project (adopted and modified from BLM Manual Section 1794).

Administrative Access: A term used to describe access for resource management and administrative purposes (such as fire suppression, cadastral surveys, permit compliance, law enforcement and military) in the performance of their official duty, or other access needed to administer BLM-administered lands or uses.

Administrative use: Administrative use includes BLM, County, Municipal, BLM Permittee, human health and safety, and valid existing rights.

Allotment: An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM-administered lands but may include other federally managed, state-owned, and private lands. An allotment may include or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotment management plan (AMP): A concisely written program of livestock grazing management, including supportive measures if required, designed to attain specific, multiple-use management goals in a grazing allotment. An AMP is prepared in consultation with the permittees, lessees, and other affected interests. Livestock grazing is considered in relation to other uses of the range (such as watershed, vegetation, and wildlife) and to renewable resources. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

Alluvial soil: A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

Alluvium: Clay, silt, sand, gravel, or other rock materials transported by moving water, deposited in comparatively recent geologic time as sorted or semi-sorted sediment in rivers, floodplains, lakes, and shores, and in fans at the base of mountain slopes.

Ambient air quality: The state of the atmosphere at ground level as defined by the range of measured and/or predicted ambient concentrations of all significant pollutants for all averaging periods of interest.

Amendment: The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans (RMPs) or management framework plans. Usually, only one or two issues are considered that involve only a portion of the planning area.

Animal unit month (AUM): The amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month.

Anthropogenic disturbances: Features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil

and gas wells, geothermal wells and associated facilities, pipelines, landfills, agricultural conversion, homes, and mines.

Aquatic: Living or growing in or on the water.

Air basin: A land area with generally similar meteorological and geographic conditions throughout. To the extent possible, air basin boundaries are defined along political boundary lines and include both the source and receptor areas.

Air pollution: Degradation of air quality resulting from unwanted chemicals or other materials occurring in the air.

Area of Critical Environmental Concern (ACEC): Special Area designation established through the BLM's land use planning process (43 CFR 1610.7-2) where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The level of allowable use within an ACEC is established through the collaborative planning process. Designation of an ACEC allows for resource use limitations in order to protect identified resources or values.

Atmospheric deposition: Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist and fall to the earth. Sometimes referred to as "acid rain" and comes from sulfur oxides and nitrogen oxides, products of burning coal and other fuels and from certain industrial processes. If the acid chemicals in the air are blown into the area where the weather is wet, the acids can fall to earth in the rain, snow, fog, or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dust or smoke.

Attainment area: A geographic area in which levels of a criteria air pollutant meet the health-based National Ambient Air Quality Standard (NAAQS) for that specific pollutant.

Authorized/authorized use: This is an activity (i.e., resource use) occurring on the BLM-administered lands that is explicitly or implicitly recognized and legalized by law or regulation. This term may refer to those activities occurring on the public lands for which the BLM, Forest Service, or other appropriate authority (e.g., Congress for Revised Statutes 2477 rights-of-way [ROWs], Federal Energy Regulatory Commission [FERC] for major interstate ROWs) has issued a formal authorization document (e.g., livestock grazing lease/permit, ROW grant, coal lease, or oil and gas permit to drill). Formally authorized uses typically involve some type of commercial activity, facility placement, or event. These formally authorized uses are often spatially or temporally limited. Unless constrained or bounded by statute, regulation, or an approved LUP decision,

legal activities involving public enjoyment and use of the public lands (e.g., hiking, camping, hunting, etc.) require no formal BLM or Forest Service authorization.

Avoidance mitigation: Avoiding the impact altogether by not taking a certain action or parts of an action (40 CFR 1508.20(a)) (e.g. may also include avoiding the impact by moving the proposed action to a different time or location).

Avoidance/avoidance area: These terms usually address mitigation of some activity (i.e., resource use). Paraphrasing the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] 1508.20), avoidance means to circumvent, or bypass, an impact altogether by not taking a certain action, or parts of an action. Therefore, the term "avoidance" does not necessarily prohibit a proposed activity, but it may require the relocation of an action, or the total redesign of an action to eliminate any potential impacts resulting from it. Also see "*right-of-way avoidance area*" definition.

Baseline: The pre-existing condition of a defined area and/or resource that can be quantified by an appropriate metric(s). During environmental reviews, the baseline is considered the affected environment that exists at the time of the review's initiation, and is used to compare predictions of the effects of the proposed action or a reasonable range of alternatives.

Best Management Practices (BMPs): A suite of techniques that guide or may be applied to management actions to aide in achieving desired outcomes. BMPs are often developed in conjunction with LUPs, but they are not considered a planning decision unless the plans specify that they are mandatory.

Big game: Indigenous, ungulate (hoofed) wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, and pronghorn antelope.

Biodiversity (biological diversity): The variety of life and its processes, and the interrelationships within and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of existing biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

Biological soil crust: A complex association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes that live within or atop the uppermost millimeters of soil.

Biologically significant unit: A geographic unit of PHMA within Greater Sage-Grouse habitat that contains relevant and important habitats. In Oregon, BSUs are synonymous with Oregon Priority Area for Conservation, which are used in the calculation of the anthropogenic disturbance threshold and in the adaptive management habitat trigger.

Breeding Habitat: Leks and the sagebrush habitat surrounding leks that are collectively used for pre-laying, breeding, nesting, and early brood-rearing, from approximately March through June (Connelly et al. 2004).

BLM-administered land: Land or interest in land owned by the US and administered by the Secretary of the Interior through the BLM without regard to how the US acquired ownership, except lands located on the outer continental shelf and land held for the benefit of Native Americans, Aleuts, and Eskimos (H-1601-1, BLM Land Use Planning Handbook).

BLM Sensitive Species: Those species that are not federally listed as endangered, threatened, or proposed under the Endangered Species Act, but that are designated by the BLM State Director under 16 United States Code (USC) 1536(a)(2) for special management consideration. By national policy, federally listed candidate species are automatically included as sensitive species. Sensitive species are managed so they will not need to be listed as proposed, threatened, or endangered under the Endangered Species Act.

Candidate species: Taxa for which the USFWS has sufficient information on their status and threats to propose the species for listing as endangered or threatened under the Endangered Species Act, but for which issuance of a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register (BLM Manual 6840, Special Status Species Manual).

Casual Use: Casual use means activities ordinarily resulting in no or negligible disturbance of the BLM-administered lands, resources, or improvements. For examples for ROWs, see 43 CFR 2801.5. For examples for locatable minerals, see 43 CFR 3809.5.

Categorical exclusion: A category of actions (identified in agency guidance) that do not individually or cumulatively have a significant effect on the human environment, and for which neither an environmental assessment nor an environmental impact statement is required (40 CFR 1508.4), but a limited form of NEPA analysis is performed.

Chemical vegetation treatment: Application of herbicides to control invasive species, noxious weeds, and/or unwanted vegetation. To meet resource objectives, the preponderance of chemical treatments would be used in areas where cheatgrass or noxious weeds have invaded sagebrush steppe.

Clean Air Act of 1963 (as amended): Federal legislation governing air pollution control.

Clean Water Act of 1972 (as amended): Federal legislation governing water pollution control.

Climate change: Any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- natural processes within the climate system (e.g., changes in ocean circulation)
- human activities that change the atmosphere's composition (e.g., driving automobiles) and the land surface (e.g., deforestation, reforestation, urbanization, or desertification)

Climate Change Adaptation Areas: Generally high altitude areas (typically above 5,000 feet) with limited habitat disturbance that the BLM has identified as likely to provide the best habitat for the sage-grouse over the long term according to current climate change scenarios.

Closed area: An area where off-road vehicle (also known as OHV) use is prohibited. Use of off-road vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer. (43 CFR 8340.0-5 (h)).

Collaboration: A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands. Collaboration may take place with any interested parties, whether or not they are a cooperating agency.

Colocation: To locate or be co-located in common area, immediately adjacent, or together, as two or more roads, transmission lines, or the like; share or designate to share the same place.

Communication site: Sites that include broadcast types of uses (e.g., television, AM/FM radio, cable television, and broadcast translator) and non-broadcast uses (e.g., commercial or private mobile radio service, cellular telephone, microwave, local exchange network, and passive reflector).

Compensatory mitigation: Compensating for the (residual) impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

Compensatory mitigation projects: The restoration, creation, enhancement, and/or preservation of impacted resources (adopted and modified from 33 CFR 332), such as on-the-ground actions to improve and/or protect habitats (e.g. chemical vegetation treatments, land acquisitions, conservation easements) (adopted and modified from BLM Manual Section 1794).

Compensatory mitigation sites: The durable areas where compensatory mitigation projects will occur (adopted and modified from BLM Manual Section 1794).

Comprehensive trails and travel management: The proactive interdisciplinary planning, on-the-ground management, and administration of travel networks (both motorized and non-motorized) to ensure public access, natural resources, and regulatory needs are considered. It consists of inventory, planning, designation, implementation, education, enforcement, monitoring, easement acquisition, mapping and signing, and other measures necessary to provide access to BLM-administered lands for a wide variety of uses (including uses for recreational, traditional, casual, agricultural, commercial, educational, landing strips, and other purposes).

Condition class (fire regimes): Fire regime condition classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, introduced insects or disease, or other management activities.

Condition of Approval: Condition or provision (requirement) under which an application for a permit to drill or sundry notice is approved.

Conformance: A proposed action shall be specifically provided for in the LUP or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

Conservation Measures: Measures to conserve, enhance, and/or restore Greater Sage-Grouse (sage-grouse or GRSG) habitat by reducing, eliminating, or minimizing threats to that habitat. Conservation measures considered during land use plan revisions or amendments in sage-grouse habitat were developed by the Sage-Grouse National Technical Team (NTT), a group of resource specialists, land use planners, and scientists from the BLM, state fish and wildlife agencies, USFWS, NRCS, and USGS. The report drafted by the NTT, titled “A Report on National Greater Sage-Grouse Conservation Measures,” provides the latest science and best biological judgment to assist in making management decisions relating to the GRSG.

Conservation Plan: The recorded decisions of a landowner or operator, cooperating with a conservation district, on how the landowner or operator plans, within practical limits, to use his/her land according to its capability and to treat it according to its needs for maintenance or improvement of the soil, water, animal, plant, and air resources.

Conservation strategy: A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threats. Conservation strategies are generally developed for species of plants and animals that are designated as BLM sensitive species or that have been determined by the USFWS or National Oceanographic and Atmospheric Administration-Fisheries to be federal candidates under the Endangered Species Act.

Conserve: To cause no degradation or loss of sage-grouse habitat. “Conserve” can also refer to maintaining intact sagebrush steppe by fine tuning livestock use, watching for and treating new invasive species, and maintaining existing range improvements that benefit sage-grouse.

Controlled surface use (CSU): Controlled surface use (CSU) is a category of moderate constraint stipulations that allows some use and occupancy of BLM-administered land while protecting identified resources or values and is applicable to fluid mineral leasing and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads). CSU areas are open to fluid mineral leasing but the stipulation allows the BLM to require special operational constraints, or the activity can be shifted more than 200 meters (656 feet) to protect the specified resource or value.

Cooperating agency: Assists the lead federal agency in developing an environmental assessment (EA) or environmental impact statement (EIS). These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any tribe or Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Core Area Habitat: The Oregon Department of Fish and Wildlife’s (ODFW’s) Sage-Grouse Conservation Assessment and Strategy for Oregon (2011) identified “Core Areas” necessary to conserve 90 percent of Oregon’s GRSG population with emphasis on areas with the highest density and most important for breeding and wintering and may serve as connectivity corridors. Core Area habitat encompasses areas a) of very high, high and moderate lek density strata; b) where low lek density strata overlap local connectivity corridors; or c) where winter habitat-use overlap with either low lek density strata, connectivity corridors, or occupied habitat. Core Area habitats encompass approximately 90 percent of the known breeding populations of GRSG on 38 percent of the species’ range. However, not all lek locations are known and some likely occur outside of the Core Areas.

Council on Environmental Quality (CEQ): An advisory council to the President of the US established by the National Environmental Policy Act of 1969 (NEPA). The CEQ reviews federal programs to analyze and interpret environmental trends and information.

Criteria pollutant: The US Environmental Protection Agency (EPA) uses six “criteria pollutants” as indicators of air quality and has established a maximum concentration for each of them above which adverse effects on human health may occur. These threshold concentrations are called NAAQS. The criteria pollutants are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead.

Crucial wildlife habitat: The environment essential to plant or animal biodiversity and conservation at the landscape level. Crucial habitats include, but are not limited to, biological core areas, severe winter range, winter concentration areas, reproduction areas, and movement corridors.

Cultural resources: Locations of human activity, occupation, or use. Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and locations of traditional cultural or religious importance to specified social or cultural groups.

Cumulative effects: The direct and indirect effects of a proposed project alternative’s incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action.

Currently Occupied Habitat: Occupied habitat areas were defined as areas of suitable habitat known to be used by GRSG within the last 10 years. Areas of suitable habitat contiguous with areas of known use were mapped as occupied habitat unless specific information existed that documented the lack of GRSG use.

Decision area: The area for which management directions and actions outlined in this RMPA/EIS will apply. This includes only BLM-administered surface lands in the planning area and BLM-administered federal mineral estate that may lie beneath other surface ownership, often referred to as split-estate lands.

Deferred/deferred use: To set-aside or postpone a particular resource use or activity on the BLM-administered lands to a later time. When this term is used, the period of the deferral is specified. Deferments sometimes follow the sequence timeframe of associated serial actions (e.g., action B will be deferred until action A is completed).

Degraded vegetation: Areas where the plant community is not complete or is under threat. Examples include missing components such as perennial forbs or cool season grasses, weed infestations, or lack of regeneration of key species such as sagebrush or cottonwoods trees.

Designation Criteria: Among other designation criteria from 43 CFR 8342.1(b), “areas and trails shall be located to minimize harassment of wildlife

or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.”

Designated roads and trails: Specific roads and trails identified by the BLM (or another agency) where some type of motorized/nonmotorized use is appropriate and allowed, either seasonally or year-long (H-1601-I, BLM Land Use Planning Handbook).

Desired future condition: For rangeland vegetation, the condition of rangeland resources on a landscape scale that meet management objectives. It is based on ecological, social, and economic considerations during the land planning process. It is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, and age and size class of species) and desired soil qualities (soil cover, erosion, and compaction). In a general context, desired future condition is a portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

Desired outcomes: A type of LUP decision expressed as a goal or objective.

Development: Active drilling and production of wells.

Development Area: Areas primarily leased with active drilling and wells capable of production in payable quantities.

Direct impacts: Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place.

Directional drilling: A drilling technique whereby a well is deliberately deviated from the vertical in order to reach a particular part of the oil- or gas-bearing reservoir. Directional drilling technology enables the driller to steer the drill stem and bit to a desired bottom hole location. Directional wells initially are drilled straight down to a predetermined depth and then gradually curved at one or more different points to penetrate one or more given target reservoirs. This specialized drilling usually is accomplished with the use of a fluid-driven downhole motor, which turns the drill bit. Directional drilling also allows multiple production and injection wells to be drilled from a single surface location such as a gravel pad, thus minimizing cost and the surface impact of oil and gas drilling, production, and transportation facilities. It can be used to reach a target located beneath an environmentally sensitive area (Alaska Department of Natural Resources, Division of Oil and Gas 2009).

Disposal lands: Transfer of BLM-administered land out of federal ownership to another party through sale, exchange, Recreation and Public Purposes Act of 1926, Desert Land Entry or other land law statutes.

Disruptive activities: Those BLM-administered land resource uses/activities that are likely to alter the behavior, displace, or cause excessive stress to existing animal or human populations occurring at a specific location and/or time. In this context, disruptive activity refers to an action that alters behavior or causes the displacement of individuals such that reproductive success is negatively affected, or an individual's physiological ability to cope with environmental stress is compromised. This term does not apply to the physical disturbance of the land surface, vegetation, or features. When administered as a land use restriction (e.g., *No Disruptive Activities*), this term may prohibit or limit the physical presence of sound above ambient levels, light beyond background levels, and/or the nearness of people and their activities. The term is commonly used in conjunction with protecting wildlife during crucial life stages (e.g., breeding, nesting, birthing, etc.), although it could apply to any resource value on the BLM-administered lands. The use of this land use restriction is not intended to prohibit all activity or authorized uses.

Diversity: The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

Durability (protective and ecological): the maintenance of the effectiveness of a mitigation site and project for the duration of the associated impacts, which includes resource, administrative/legal, and financial considerations (adopted and modified from BLM Manual Section 1794).

Easement: A right afforded a person or agency to make limited use of another's real property for access or other purposes.

Ecological Site: A distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Effectiveness monitoring: The process of collecting data and information in order to determine whether or not desired outcomes (expressed as goals and objectives in the land use plan) are being met (or progress is being made toward meeting them) as the allowable uses and management actions are being implemented. A monitoring strategy must be developed as part of the land use plan that identifies indicators of change, acceptable thresholds, methodologies, protocols, and timeframes that will be used to evaluate and determine whether or not desired outcomes are being achieved.

Emergency stabilization: Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Emergency stabilization actions must be taken within one year following containment of a wildfire.

Endangered species: Any species that is in danger of extinction throughout all or a significant portion of its range (BLM Manual 6840, Special Status Species Manual). Under the Endangered Species Act, “endangered” is the more-protected of the two categories. Designation as endangered or threatened is determined by USFWS as directed by the Endangered Species Act.

Endangered Species Act of 1973 (as amended): Designed to protect critically imperiled species from extinction as a consequence of economic growth and development untempered by adequate concern and conservation. The Act is administered by two federal agencies, USFWS and the National Oceanic and Atmospheric Administration. The purpose of the Act is to protect species and also the ecosystems upon which they depend (16 USC 1531-1544).

Enhance: The improvement of habitat by increasing missing or modifying unsatisfactory components and/or attributes of the plant community to meet sage-grouse objectives. Examples include modifying livestock grazing systems to improve the quantity and vigor of desirable forbs, improving water flow in riparian areas by modifying existing spring developments to return more water to the riparian area below the development, or marking fences to minimize sage-grouse hits and mortality.

Environmental assessment (EA): A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted.

Environmental impact statement (EIS): A detailed statement prepared by the responsible official in which a major federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed (BLM National Management Strategy for Off-highway Vehicle [OHV] Use on Public Lands).

Evaluation (plan evaluation): The process of reviewing the land use plan and the periodic plan monitoring reports to determine whether the land use plan decisions and NEPA analysis are still valid and whether the plan is being implemented.

Exchange: A transaction whereby the federal government receives land or interests in land in exchange for other land or interests in land.

Exclusion Areas: An area on the BLM-administered lands where a certain activity is prohibited to insure protection of other resource values present on the site. The term is frequently used in reference to lands/realty actions and proposals (e.g., ROWs), but is not unique to lands and realty program activities. This restriction is functionally analogous to the phrase “no surface occupancy”

used by the oil and gas program and is applied as an absolute condition to those affected activities. The less restrictive analogous term is avoidance area. Also see “*right-of-way exclusion area*” definition.

Existing routes: The roads, trails, or ways that are used by motorized vehicles (e.g., jeeps, all-terrain vehicles, and motorized dirt bikes), mechanized uses (e.g., mountain bikes, wheelbarrows, and game carts), pedestrians (e.g., hikers), and/or equestrians (e.g., horseback riders) and are, to the best of BLM’s knowledge, in existence at the time of RMP/EIS publication.

Exploration: Active drilling and geophysical operations to:

- a. Determine the presence of the mineral resource
- b. Determine the extent of the reservoir or mineral deposit.

Extensive recreation management area (ERMA): Administrative units that require specific management consideration in order to address recreation use, demand, or Recreation and Visitor Services program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses.

Facility: Any physical development, including land treatments and improvements, constructed on land or water, to aid the management of public lands (BLM Manual Section 9100).

Federal Land Policy and Management Act of 1976 (FLPMA): Public Law 94-579, October 21, 1976, often referred to as the BLM’s “Organic Act,” which provides most of the BLM’s legislated authority, direction policy, and basic management guidance.

Federal mineral estate: Subsurface public mineral estate administered by the BLM. Federal mineral estate under BLM jurisdiction is composed of mineral estate underlying BLM-administered lands, privately owned lands, and state-owned lands

Fire frequency: A general term referring to the recurrence of fire in a given area over time.

Fire management plan (FMP): A plan that identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wildland fires (wildfire, prescribed fire, and wildland fire use). The plan is supplemented by operational plans including, but not limited to, preparedness plans, preplanned dispatch plans, and prevention plans. FMPs assure that wildland fire management goals and components are coordinated.

Fire Regime Condition Classification System (FRCCS): Measures the extent to which vegetation departs from reference conditions, or how the current vegetation differs from a particular reference condition.

Fire suppression: All work and activities connected with control and fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Fluid minerals: Oil, gas, coal bed natural gas, and geothermal resources.

Forage: All browse and herbaceous foods that are available to grazing animals.

Forage base: The amount of vegetation available for wildlife and livestock use.

Fragile soils: Soils having a shallow depth to bedrock, minimal surface layer of organic material, textures that are more easily detached and eroded, or are on slopes over 35 percent.

Free use permit: BLM's authority to dispose of sand, gravel, and other mineral and vegetative materials, not subject to mineral leasing or location under the mining laws, from public lands without charge. Free use permits are only allowed for governmental and non-profit use. Other uses under a free use permit are prohibited.

Fugitive dust: Significant atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed "fugitive" because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include unpaved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations.

Future Temporary Closures: Where off-road vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. This may include closure of routes or areas. (43 CFR 8341.2)

General Sage-Grouse habitat: Occupied (seasonal or year-round) habitat outside of priority habitat. These areas have been identified by state fish and wildlife agencies in coordination with respective BLM offices.

Genotype: The genetic makeup of an organism, usually with reference to a set of specific characteristics under consideration. In the context of seed for

restoration, a local genotype refers to a source of seed that is genetically adapted to the environment it is going to be used in.

Geographic Information System (GIS): A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

Geophysical exploration: Efforts to locate deposits of oil and gas resources and to better define the subsurface.

Geothermal energy: Natural heat from within the Earth captured for production of electric power, space heating, or industrial steam.

Goal: A broad statement of a desired outcome that is usually not quantifiable and may not have established timeframes for achievement.

Grandfathered right: The right to use in a non-conforming manner due to existence prior to the establishment of conforming terms and conditions.

Grazing preference: A superior or priority position for the purpose of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by a permittee or lessee.

Grazing system: Scheduled grazing use and non-use of an allotment to reach identified goals or objectives by improving the quality and quantity of vegetation. Include, but are not limited to, developing pastures, utilization levels, grazing rotations, timing and duration of use periods, and necessary range improvements.

Groundwater: Water held underground in soil or permeable rock, often feeding springs and wells.

Guidelines: Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as BMPs. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2.

Habitat: An environment that meets a specific set of physical, biological, temporal, or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle.

Habitat Suitability: The relative appropriateness of a certain ecological area for meeting the life requirements of an organism (i.e., food, shelter, water, space)

Hazardous material: A substance, pollutant, or contaminant that, due to its quantity, concentration, or physical or chemical characteristics, poses a potential

hazard to human health and safety or to the environment if released into the workplace or the environment.

High Density Breeding Areas: Areas of high quality habitat with a high density of active sage-grouse leks. The Restoration Opportunity Zones are areas within existing sage-grouse habitat that if restored can provide better quality habitat and greater habitat connectivity for the sage-grouse.

Impact: The effect, influence, alteration, or imprint caused by an action.

Impairment: The degree to which a distance of clear visibility is degraded by human-made pollutants.

Implementation decisions: Decisions that take action to implement land use planning; generally appealable to Interior Board of Land Appeals under 43 CFR 4.410.

Implementation monitoring: The process of tracking and documenting the implementation (or the progress toward implementation) of land use plan decisions. This should be done at least annually and should be documented in the form of a tracking log or report. The report must be available for public review.

Implementation plan: An area or site-specific plan written to implement decisions made in a LUP. Implementation plans include both activity plans and project plans.

Indicators: Factors that describe resource condition and change and can help the BLM determine trends over time.

Indirect impacts: Indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

Intermittent stream: A stream that flows only at certain times of the year when it receives water from springs or from some surface sources such as melting snow in mountainous areas. During the dry season and throughout minor drought periods, these streams will not exhibit flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors, such as pollution and thermal modifications, species are scarce and adapted to the wet and dry conditions of the fluctuating water level.

Invertebrate: An animal lacking a backbone or spinal column, such as insects, snails, and worms. The group includes 97 percent of all animal species.

Jackpot burning: Refers to burning only concentrations of fuels as opposed to broadcast burning which refers to burning across all or most surface fuels.

Key Areas of Critical Environmental Concern: Special management areas that have been identified as having a high utility for conservation of GRSG. These existing land allocations were designated previously in existing RMPs to protect other relevant and important resource values, but also contain quality GRSG habitat, are within PPMA, contain leks, and GRSG is proposed as an additional relevant/important value that they will be managed for. These areas should be priority areas for GRSG management, and site specific ACEC management plans will be prepared at the implementation level that will address special management for GRSG, as well as the other values for which the ACEC was originally designated.

Key Research Natural Areas: Special type of ACEC that were designated previously in existing RMPs to protect specific intact representative native plant communities. These areas are located within PPMA and will be utilized for long-term vegetation monitoring for native plant communities important for GRSG in the absence of BLM actions and disturbance by man. These areas will provide baseline vegetation information to document successional changes, serve as areas for comparison to treated areas, and to document vegetational shifts in the plant communities in the future caused by changes in precipitation and temperature (climate change). The key RNAs either contain GRSG leks, or are within 0.1 to 4 miles of leks and are, or likely are, utilized for nesting, brood-rearing, foraging, breeding or wintering.

Key wildlife ecosystems: Specific areas within the geographic area occupied by a species in which are found those physical and biological features 1) essential to the conservation of the species, and 2) which may require special management considerations or protection.

Land health condition: A classification for land health which includes these categories: “Meeting Land Health Standard(s)” and “Not Meeting Land Health Standard(s)”.

Meeting Land Health Standard(s): Lands for which health indicators are currently in acceptable condition such that basic levels of ecological processes and functions are in place. This rating includes the following subcategories:

- Fully Meeting Standard(s): Lands for which there are no substantive concerns with health indicators
- Exceeding Standard(s): Lands for which health indicators are in substantially better conditions than acceptable levels.
- Meeting Standard(s) with Problems: Lands which have one or more concerns with health indicators to the degree that they are

categorized as meeting the Land Health Standards, but have some issues which make them at risk of becoming “not meeting.”

Not Meeting Land Health Standard(s): Lands for which one or more health indicators are in unacceptable conditions such that basic levels of ecological processes and functions are no longer in place. Land health trend is used to describe these classes further. It includes these categories: upward, static, and downward.

- **Upward Trend:** lands which have shown improving indicator conditions over time.
- **Static Trend:** lands which have shown no clear improvement or decline in indicator conditions over time.
- **Downward Trend:** lands which have shown declining indicator conditions over time.

Land tenure adjustments: Land ownership or jurisdictional changes. To improve the manageability of the BLM-administered lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges but also through land sales, through jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

Land treatment: All methods of artificial range improvement arid soil stabilization such as reseeding, brush control (chemical and mechanical), pitting, furrowing, and water spreading.

Land use allocation: The identification in a LUP of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions (H-1601-I, BLM Land Use Planning Handbook).

Land use plan (LUP): A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of LUP-level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed. The term includes both RMPs and management framework plans (from H-1601-I, BLM Land Use Planning Handbook).

Land use plan decision: Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to Interior Board of Land Appeals.

Land Use Zone 1: Zone 1 lands have been identified as having national or statewide significance and are identified for retention in public ownership. These lands possess significant visual, wildlife, watershed, special status species, wilderness, recreational, vegetative, cultural, or other public values.

Land Use Zone 2: Zone 2 lands have potentially high resource values for timber, recreation, riparian, watershed, special status species, cultural, and wildlife. Zone 2 lands are identified for retention or possible exchange for land with higher resource values or transfer through the Recreation and Public Purposes (R&PP) Act.

Land Use Zone 3: Zone 3 lands are scattered, isolated tracts of BLM-administered lands having generally low or unknown resource values. Zone 3 lands are potentially suitable for transfer or disposal if significant recreation, wildlife, watershed, special status species, or cultural values are not identified. Community expansion lands possess high public values, due to their proximity to expanding communities, and provide important open space and dispersed recreation opportunities.

Integrated ranch planning: A method for ranch planning that takes a holistic look at all elements of the ranching operations, including strategic and tactical planning, rather than approaching planning as several separate enterprises.

Large-scale anthropogenic disturbances: Features include but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, agricultural conversion, homes, and mines.

Late brood-rearing habitat: Variety of habitats used by sage-grouse from July through September. Habitat includes mesic sagebrush and mixed shrub communities, wet meadows, and riparian areas as well as some agricultural lands (e.g. alfalfa fields).

Leasable minerals: Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources such as oil, natural gas, coal, and geothermal, and some non-energy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lease: Section 302 of the FLPMA provides the BLM's authority to issue leases for the use, occupancy, and development of BLM-administered lands. Leases are issued for purposes such as a commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, native or introduced species harvesting, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim

occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and non-irrigation facilities. The regulations establishing procedures for processing these leases and permits are found in 43 CFR 2920.

Lease stipulation: A modification of the terms and conditions on a standard lease form at the time of the lease sale.

Lek: An area where male sage-grouse display during the breeding season to attract females (also referred to as strutting-ground). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks.

Lek Complex: A collection of lek sites typically with small numbers of males which are associated with a larger lek site in the vicinity (less than or equal to 1 mile). A count of a lek complex generally includes systematically acquiring and recording information about all displaying males in a series of leks where no 2 lek sites are more than 1 mile apart.

Lek Status Definitions

- **Annual status:** Lek status based on the following definitions of annual activity (Hagen 2011):
 - **Active Lek:** A lek attended by 1 male sage-grouse or more during the breeding season. Acceptable documentation of sage-grouse presence includes observation of birds using the site or recent signs of lek attendance (e.g. fresh droppings, feathers). New leks found during ground counts or surveys are given an annual status of active.
 - **Inactive Lek:** A lek with sufficient survey data to suggest that there was no male attendance throughout a breeding season. Absence of male grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of birds on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under acceptable weather conditions (clear to partly cloudy and winds less than 15 kilometers per hour [less than 10 miles per hour]) and in the absence of obvious disturbance or, 2) a ground check of the exact known lek site late in the strutting season that fails to find any sign (fresh droppings/feathers) of attendance. Data collected by aerial surveys alone may not be used to designate inactive status.
 - **Unknown lek:** Lek status has not been documented during the course of a breeding season. New leks found during

aerial surveys in the current year are given an annual status of unknown unless they are confirmed on the ground or observed more than once by air.

- **Conservation status:** Based on its annual status, a lek is assigned to one of the following categories for conservation or mitigation actions (Hagen 2011):
 - **Occupied Lek:** A regularly visited lek that has had 1 male or more counted in one or more of the last 7 years. Designate and protect surrounding area as Category 1 habitat.
 - **Occupied-pending:** A lek not counted regularly in the last 7 years, but birds were present at last visit. Designate and protect surrounding area as Category 1 habitat. These leks should be resurveyed at a minimum of two additional years to confirm activity.
 - **Pending lek:** A lek not counted regularly in the last seven years, but birds were present one or more years of that period.
 - **Unoccupied Lek:** A lek that has been counted annually and has had no birds for 8 or more consecutive years. Mitigation category based on habitat type and condition.
 - **Unoccupied-pending:** A lek not counted regularly in a 7-year period, but birds were NOT present at last visit. Designate and protect surrounding area as Category 1 habitat. These leks should be resurveyed at a minimum of 2 additional years to confirm activity
 - **Historic lek:** A lek that has been unoccupied prior to 1980 and remains so. Mitigation category based on habitat type and condition (1980 serves as the baseline for evaluating population objectives under ODFW's Sage-grouse Conservation Strategy, thus leks unoccupied prior to 1980 are not included in the baseline for population abundance and distribution.)

Lentic: Pertaining to standing water, such as lakes and ponds.

Limited area: An area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: Numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails; and other restrictions.

Livestock facilities: Include but are not limited to livestock water troughs, dirt tanks, dugouts, storage tanks, wells, fences, corrals, dusting bags, and handling facilities that are utilized in managing livestock grazing.

Local Implementation Team: Implementation of conservation guidelines outlined in *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitats* will be guided by Local Implementation Teams comprised of ODFW, land managers, and land owners. Because these groups are not mutually exclusive and include a mix of public and private entities, the BLM is the primary land manager; local groups are based on BLM district boundaries (and in some cases Resource Areas).

Locatable minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Long-term effect: The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more.

Lotic: Pertaining to moving water, such as streams or rivers.

Low Density Habitat: The ODFW's Sage-Grouse Conservation Assessment and Strategy for Oregon (2011) defines low density habitat as breeding, summer, and migratory habitats that are encompassed by areas where: a) low lek density overlapped with seasonal connectivity corridors; b) local corridors outside of all lek density strata; c) low lek density strata outside of connectivity corridors; or d) seasonal connectivity corridors outside of all lek density strata.

Master Development Plans: A set of information common to multiple planned wells, including drilling plans, Surface Use Plans of Operations, and plans for future production.

Mechanized transport: Any vehicle, device, or contrivance for moving people or material in or over land, water, snow, or air that has moving parts.

Mineral: Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (such as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained usually from the ground. Under federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

Mineral entry: The filing of a claim on BLM-administered land to obtain the right to any locatable minerals it may contain.

Mineral estate: The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mineralize: The process where a substance is converted from an organic substance to an inorganic substance.

Mineral materials: Common varieties of mineral materials such as soil, sand and gravel, stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws but that can be acquired under the Materials Act of 1947, as amended.

Minimization mitigation: Minimizing impacts by limiting the degree or magnitude of the action and its implementation (40 CFR 1508.20 (b)).

Mining claim: A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, mill site, and tunnel site.

Mining Law of 1872: Provides for claiming and gaining title to locatable minerals on BLM-administered lands. Also referred to as the “General Mining Laws” or “Mining Laws.”

Mitigation: Includes specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action, minimizing the impact by limiting the degree of magnitude of the action and its implementation, rectifying the impact by repairing, rehabilitation, or restoring the affected environment, reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, and compensating for the impact by replacing or providing substitute resources or environments.

Modification: A change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

Monitoring (plan monitoring): The process of tracking the implementation of LUP decisions and collecting and assessing data necessary to evaluate the effectiveness of land use planning decisions.

Motorized vehicles or uses: Vehicles that are motorized, including jeeps, all-terrain vehicles (such as four-wheelers and three-wheelers), trail motorcycles or dirt bikes, and aircrafts.

Multiple-use: The management of the BLM-administered lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people. Multiple-use is implemented by making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment and giving consideration to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (FLPMA).

Municipal watershed: A watershed area that provides water for use by a municipality as defined by the community and accepted by the state.

National Environmental Policy Act of 1969 (NEPA): Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.

National Register of Historic Places (NRHP): A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance established by the National Historic Preservation Act of, 1966 and maintained by the National Park Service.

Native seed mix: Any seed mix with any amount of non-native seeds cannot be called a “native” seed mix.

Native vegetation: Plant species which were found in a location prior to European contact, and consequently are in balance with these ecosystems because they have well developed parasites, predators, and pollinators.

Natural processes: Fire, drought, insect and disease outbreaks, flooding, and other events that existed prior to European contact and shaped vegetation composition and structure.

Net Conservation Gain: The actual benefit or gain above baseline conditions. Actions which result in habitat loss and degradation include those identified as threats which contribute to Greater Sage-Grouse disturbance as identified by the U.S. Fish and Wildlife Service in its 2010 listing decision (75 FR 13910) and shown in Table 2 in the attached Monitoring Framework (Appendix G).

Nonenergy leasable minerals: Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. Nonenergy minerals include resources such as phosphate, sodium, potassium, and sulfur.

Nonfunctional condition: Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or woody debris to dissipate energies associated with flow events, and thus are not reducing erosion, improving water quality, etc.

No surface occupancy (NSO): A major constraint where use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads) are prohibited to protect identified resource values. Areas identified as NSO are open to fluid mineral leasing, but surface occupancy or surface-disturbing activities associated with fluid mineral leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area.

Notice-level mining activities: To qualify for a Notice the mining activity must: 1) constitute exploration, 2) not involve bulk sampling of more than 1,000 tons of presumed ore, 3) must not exceed 5 acres of surface disturbance, and 4) must not occur in one of the special category lands listed in 43 CFR 3809.11(c). The Notice is to be filed in the BLM field office with jurisdiction over the land involved. The Notice does not need to be on a particular form but must contain the information required by 43 CFR 3809.301(b).

Noxious weeds: A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the US.

Objective: A description of a desired outcome for a resource. Objectives can be quantified and measured and, where possible, have established timeframes for achievement.

Occupied Habitat: Areas of suitable habitat (i.e., sagebrush cover 5% or greater and tree cover <5%) known to be used by sage-grouse within the last 10 years. Areas of suitable habitat contiguous with areas of known use that do not have effective barriers to sage-grouse movement from known use areas may be considered occupied habitat, unless specific information exists that documents the lack of sage-grouse use. Occupancy can be verified with telemetry locations, sightings of sage-grouse or sage-grouse sign (e.g., feces, feathers), local biological expertise, GIS data or other data sources recognized by the BLM and ODFW.

Off-highway vehicle (OHV or off-road vehicle [ORV]): Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or

other natural terrain, excluding: (1) Any nonamphibious registered motorboat; (2) Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) Any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) Vehicles in official use; and (5) Any combat or combat support vehicle when used in times of national defense emergencies (43CFR8342.0-5(a)).

OHV Area Plan Decision: Routes within PPMA would be limited to existing roads, primitive roads, and trails. The OHV designation would change from “limited to existing roads, primitive roads, and trails” to “limited to designated roads, primitive, roads, and trails” upon the completion of travel management plans.

Official use: Use by an employee, agent, or designated representative of the Federal Government or one of its contractors, in the course of his employment, agency, or representation.

Offsite Mitigation: Compensating for resource impacts by replacing or providing substitute resources or habitat at a different location than the project area.

Open: Denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 defines the specific meaning of “open” as it relates to OHV use.

Oregon Priority Area for Conservation: A geographic unit of PHMA that the Oregon Department of Fish and Wildlife mapped from the Priority Areas of Conservation (PACs) initially created by the U.S. Fish and Wildlife Service (FWS 2013). There are 20 Oregon PACs, each with a unique name. Oregon PACs are used in the calculation of the anthropogenic disturbance threshold and in the adaptive management habitat trigger. Other planning efforts may call similar unit a BSU.

Ozone: A faint blue gas produced in the atmosphere from chemical reactions of burning coal, gasoline, and other fuels and chemicals found in products such as solvents, paints, and hairsprays.

Paleontological resources: The physical remains or other physical evidence of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are important for correlating and dating rock strata and for understanding past environments, environmental change, and the evolution of life.

Parallel Road: A parallel road is a road that follows the same topography, sight lines, and ends at the same destination. Parallel roads are usually user created roads that occur because of the lack of maintenance on an existing road.

Particulate matter (PM): One of the six “criteria” pollutants for which the Environmental Protection Agency established NAAQS. Particulate matter is defined as two categories, fine particulates, with an aerodynamic diameter of 10 micrometers (PM₁₀) or less, and fine particulates with an aerodynamic diameter of 2.5 micrometers or less (PM_{2.5}).

Perennial stream: A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

Permitted use: The forage allocated by, or under the guidance of, an applicable LUP for livestock grazing in an allotment under a permit or lease and expressed in AUMs (43 CFR 4100.0-5).

Permittee: A person or company permitted to graze livestock on BLM-administered land.

Physiography: The study and classification of the surface features of the earth.

Plan of Operations: A Plan of Operations is required for all mining activity exploration greater than 5 acres or surface disturbance greater than casual use on certain special category lands. Special category lands are described under 43 CFR 3809.11(c) and include such lands as designated ACECs, lands within the National Wilderness Preservation System, and areas closed to off-road vehicles, among others. In addition, a plan of operations is required for activity greater than casual use on lands patented under the Stock Raising Homestead Act with Federal minerals where the operator does not have the written consent of the surface owner (43 CFR 3814). The Plan of operations needs to be filed in the BLM field office with jurisdiction over the land involved. The Plan of Operations does not need to be on a particular form but must address the information required by 43 CFR 3809.401(b).

Planning area: The planning area is the geographic area for which resource management plans are developed and maintained. The planning area boundary includes all lands regardless of jurisdiction which contain mapped PPH and PGH. For this RMPA/EIS, the planning area is the entire Oregon Sub-region and covers all or a portions of 17 counties in Oregon and 1 county in Washington; however, PPH and PGH are only found in Baker, Crook, Deschutes, Grant, Harney, Lake, Malheur, and Union counties in Oregon. Lands within the planning area include a mix of private, federal, and state lands.

Planning criteria: The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamlines and simplifies the resource management planning actions.

Planning issues: Concerns, conflicts, and problems with the existing management of BLM-administered lands. Frequently, issues are based on how

land uses affect resources. Some issues are concerned with how land uses can affect other land uses, or how the protection of resources affects land uses.

Policy: This is a statement of guiding principles, or procedures, designed and intended to influence planning decisions, operating actions, or other affairs of the BLM or Forest Service. Policies are established interpretations of legislation, executive orders, regulations, or other presidential, secretarial, or management directives.

Potential Habitat: Area is currently unoccupied but has the potential for occupancy in the foreseeable future (less than 100 years), through succession or restoration (Stiver et al. 2010).

Preliminary General Habitat (PGH): Areas of occupied seasonal or year-round habitat outside of preliminary priority habitat.

Preliminary General Management Area (PGMA): BLM-administered lands identified requiring special management to sustain sage-grouse populations, but that are not as important as PPMAs. The PGMA's are derived from and generally follow the PGH boundaries but may be modified in extent based on the objectives of each alternative. Likewise, management strategies applied to the PGMA's may vary by alternative.

Preliminary Priority Habitat (PPH): Areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations. These areas include breeding, late brood-rearing, and known winter concentration areas.

Preliminary Priority Management Area (PPMA): BLM-administered lands identified to be managed as having the highest value to maintaining sustainable sage-grouse populations. The PPMAs are derived from and generally follow the PPH boundaries but may be modified in extent based on the objectives of each alternative. Likewise, management strategies applied to the PPMAs may vary by alternative.

Prescribed fire: A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met prior to ignition.

Primitive road: A linear route managed for use by four-wheel drive or high-clearance vehicles. Primitive roads do not normally meet any BLM road design standards.

Primitive route: Any transportation linear feature located within areas that have been identified as having wilderness characteristics and not meeting the wilderness inventory road definition (BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands).

Priority Areas for Conservation (PAC): Term introduced by the USFWS to encompass the most important areas needed for maintaining sage-grouse representation, redundancy, and resilience across the landscape (USFWS 2013a).

Priority sage-grouse habitat: Areas that have been identified as having the highest conservation value to maintaining sustainable sage-grouse populations. These areas would include breeding, late brood-rearing, and winter concentration areas. These areas have been identified by the BLM in coordination with respective state wildlife agencies.

Proper functioning condition: A term describing stream health that is based on the presence of adequate vegetation, landform and debris to dissipate energy, reduce erosion and improve water quality.

Public domain: The term applied to any or all of those areas of land ceded to the federal government by the original states and to lands acquired by treaty, purchase, or cession, and are disposed of only under the authority of Congress.

Range Improvement: Any activity, structure or program on or relating to rangelands which is designed to improve production of forage; change vegetative composition; control patterns of use; provide water; stabilize soil and water conditions; and provide habitat for livestock and wildlife. The term includes structures, treatment projects, and use of mechanical means to accomplish the desired results.

Range improvement project: An authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; restore, protect and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. This definition includes, but is not limited to: structures, treatment projects and use of mechanical devices, or modifications achieved through mechanical means.

Raptor: Bird of prey with sharp talons and strongly curved beaks, such as hawks, owls, falcons, and eagles.

Reasonable foreseeable development scenario: The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

Recreation management area: Includes special recreation management areas (SRMAs) and extensive recreation management areas (ERMAs); see SRMA and ERMA definitions.

Recreation experiences: Psychological outcomes realized either by recreation-tourism participants as a direct result of their on-site leisure engagements and recreation-tourism activity participation or by nonparticipating community residents as a result of their interaction with visitors and guests within their community or interaction with the BLM and other public and private recreation-tourism providers and their actions.

Recreation opportunities: Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.

Recreation settings: The collective distinguishing attributes of landscapes that influence and sometimes actually determine what kinds of recreation opportunities are produced.

Recreation use permit: Camping fees, daily use fees, etc.

Reclamation: Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves re-contouring, replacement of topsoil, re-vegetation, and other work necessary to ensure eventual restoration of the site. The suite of actions taken within an area affected by human disturbance, the outcome of which is intended to change the condition of the disturbed area to meet pre-determined objectives and/or make it acceptable for certain defined resources (e.g., wildlife habitat, grazing, and ecosystem function).

Reference state: The state where the functional capacities represented by soil/site stability, hydrologic function, and biotic integrity are performing at an optimum level under the natural disturbance regime. This state usually includes, but is not limited to, what is often referred to as the potential natural plant community.

Rehabilitate: Returning disturbed lands as near to its predisturbed condition as is reasonably practical or as specified in approved permits.

Renewable energy: Energy resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the Earth is a virtually inexhaustible reserve of potential energy

Required Design Features (RDFs): Required Design Features (RDFs) are required for certain activities in all GRS habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations

(e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat;
- A specific RDF will provide no additional protection to GRSG or its habitat.

Reserve common allotment: An area which is designated in the land use plan as available for livestock grazing but reserved as an area available for use as an alternative to grazing in another allotment in order to facilitate rangeland restoration treatments and recovery from natural disturbances such as drought or wildfire. The reserve common allotment would provide needed flexibility that would help the agency apply temporary rest from grazing where vegetation treatments and/or management would be most effective.

Residual impacts: Impacts that remain after applying avoidance and minimization mitigation; also referred to as unavoidable impacts.

Resilience from disturbance: The ability of a site to regain its fundamental species composition, structure, ecological processes and functioning when altered by stressors such as drought and disturbances such as fire.

Resistance to invasion: The ability of a site to retain its fundamental plant community species composition, ecological processes and functioning when exposed to invasive plant species.

Resource Management Plan (RMP): An LUP, as prescribed by the FLPMA, that establishes, land-use allocations, coordination guidelines for multiple-use, objectives, and actions to be achieved for a given area of land.

Restoration: Implementation of a set of actions that promotes plant community diversity and structure that allows plant communities to be more resilient to disturbance and invasive species over the long term. The long-term goal is to create functional, high quality habitat that is occupied by sage-grouse. Short-term goal may be to restore the landform, soils and hydrology and increase the percentage of preferred vegetation, seeding of desired species, or treatment of undesired species.

Restoration Opportunity Areas: Areas within existing sage-grouse habitat that, if restored, can provide better quality habitat and greater habitat connectivity for the sage-grouse.

Restriction/restricted use: A limitation or constraint on BLM-administered land uses and operations. Restrictions can be of any kind, but most commonly apply to certain types of vehicle use, temporal and/or spatial constraints, or certain authorizations.

Revegetate/revegetation: The process of putting vegetation back in an area where vegetation previously existed, which may or may not simulate natural conditions.

Revision: The process of completely rewriting the land use plan due to changes in the planning area affecting major portions of the plan or the entire plan.

Right-of-way (ROW): A right-of-way (ROW) grant is an authorization to use a specific piece of BLM-administered land for a certain project, such as roads, pipelines, transmission lines, and communication sites. A ROW grant authorizes rights and privileges for a specific use of the land for a specific period of time. Generally, a BLM ROW is granted for a term appropriate for the life of the project. Minor ROWs are typically less than about 15 miles in length and are not to exceed about 52 acres of disturbance.

Right-of-way (ROW) avoidance area: An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations.

Right-of-way (ROW) exclusion area: An area identified through resource management planning that is not available for ROW location under any conditions.

Riparian area: A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

Riparian zone: An area 0.25-mile wide encompassing riparian and adjacent vegetation.

Risk of Disturbance: Risk of disturbance is defined, for the purposes of the greater sage grouse amendment as, “any anthropogenic disturbance that would

cause greater sage grouse to avoid, abandon habitat, or modify behavior within habitat.

Road: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Rotation. Grazing rotation between pastures in the allotment for the permitted time.

Routes: Multiple roads, trails and primitive roads; a group or set of roads, trails, and primitive roads that represents less than 100 percent of the BLM transportation system. Generically, components of the transportation system are described as “routes.”

Sagebrush Focal Area: Areas identified by the FWS that represent recognized “strongholds” for GRSG that have been noted and referenced by the conservation community as having the highest densities of GRSG and other criteria important for the persistence of GRSG.

Sale (BLM-administered land): A method of land disposal pursuant to Section 203 of FLPMA, whereby the US receives a fair-market payment for the transfer of land from federal ownership. BLM-administered lands determined suitable for sale are offered on the initiative of the BLM. Lands suitable for sale must be identified in the RMP. Any lands to be disposed of by sale that are not identified in the current RMP, or that meet the disposal criteria identified in the RMP, require a plan amendment before a sale can occur.

Saturated soils: Occur when the infiltration capacity of the soil is exceeded from above due to rainfall or snowmelt runoff. Soils can also become saturated from groundwater inputs.

Scenic byways: Highway routes that have roadsides or corridors of special aesthetic, cultural, or historical value. An essential part of the highway is its scenic corridor. The corridor may contain outstanding scenic vistas, unusual geologic features, or other natural elements.

Scoping process: An early and open public participation process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

Season of use: The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

Seeding: Seeding is a vegetation treatment that includes the application of grass, forb, or shrub seed, either aerially or from the ground. In areas of gentle terrain, ground applications of seed are often accomplished with a rangeland

drill. Seeding allows the establishment of native species or placeholder species and restoration of disturbed areas to a perennial-dominated cover type, thereby decreasing the risk of subsequent invasion by exotic plant species. Seeding would be used primarily as a follow-up treatment in areas where disturbance or the previously described treatments have removed exotic plant species and their residue.

Short-term effect: The effect occurs only during or immediately after implementation of the alternative.

Significant factor: Principal causal factor in the failure to achieve the land health standards(s) and conform with the guidelines. A significant factor would typically be a use that, if modified, would enable an area to achieve or make significant progress toward achieving the land health standards(s). To be a significant factor, a use may be one of several factors contributing to less-than-healthy conditions; it need not be the sole causal factor inhibiting progress towards the standard.

Special recreation management area (SRMA): An administrative BLM-administered lands unit identified in land use plans where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation.

Special recreation permit (SRP): Authorization that allows for recreational uses of BLM-administered lands and related waters. Issued as a means to control visitor use, protect recreational and natural resources, and provide for the health and safety of visitors. Commercial SRPs are also issued as a mechanism to provide a fair return for the commercial use of BLM-administered lands.

Special status species: BLM special status species are: (1) species listed, candidate, or proposed for listing under the Endangered Species Act; and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the Endangered Species Act that are designated as BLM sensitive by the BLM State Director(s). All federally listed candidate species, proposed species, and delisted species in the five years following delisting are conserved as BLM sensitive species.

Split-estate: This is the circumstance where the surface of a particular parcel of land is owned by a different party than the minerals underlying the surface. Split estates may have any combination of surface/subsurface owners: federal/state; federal/private; state/private; or percentage ownerships. When referring to the split estate ownership on a particular parcel of land, it is generally necessary to describe the surface/subsurface ownership pattern of the parcel.

Stabilize: The process of stopping further damage from occurring.

Standard: A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards). To be expressed as a desired outcome (goal).

Standard lease terms and conditions: Areas may be open to leasing with no specific management decisions defined in a RMP; however, these areas are subject to lease terms and conditions as defined on the lease form (Form 3100-11, Offer to Lease and Lease for Oil and Gas; and Form 3200-24, Offer to Lease and Lease for Geothermal Resources).

Standards for Rangeland Health: Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the States of Oregon and Washington (August 1997) are found at:

http://www.blm.gov/or/resources/recreation/csnm/files/rangeland_standards.pdf

State: A state is comprised of an integrated soil and vegetation unit having one or more biological communities that occur on a particular ecological site and that are functionally similar with respect to the three attributes (soil/site stability, hydrologic function, and biotic integrity) under natural disturbance regimes.

Stochastic: Randomly determined event, chance event, a condition determined by predictable processes and a random element.

Strategic Areas: a network is comprised of three types of strategic areas: Climate Change Refugia, High Density Breeding Areas, and Restoration Opportunity Zones. The BLM has identified these areas in order to help focus and prioritize habitat restoration, off-site mitigation, conservation partnering, sage-grouse habitat and population monitoring and assessments, and post-fire emergency stabilization and rehabilitation efforts, and to provide special consideration during fire suppression to help sustain productive sage-grouse habitat.

Strongholds: Large areas of intact habitat where habitats and populations appear stable (Wisdom et al. 2011).

Stipulation (general): A term or condition in an agreement or contract.

Stipulation (oil and gas): A provision that modifies standard oil and gas lease terms and conditions in order to protect other resource values or land uses and is attached to and made a part of the lease. Typical lease stipulations include No Surface Occupancy (NSO), Timing Limitations (TL), and Controlled Surface Use (CSU). Lease stipulations are developed through the land use planning (RMP) process.

Suitable Habitat: Area provides environmental conditions necessary for successful survival and reproduction to sustain stable populations. Suitable habitat commonly has sagebrush cover 5 percent or greater and tree cover less than 5 percent.

Surface disturbance: Suitable habitat is considered disturbed when it is removed and unavailable for immediate sage-grouse use.

- a. Long-term removal occurs when habitat is physically removed through activities that replace suitable habitat with long term occupancy of unsuitable habitat such as a road, power line, well pad or active mine. Long-term removal may also result from any activities that cause soil mixing, soil removal, and exposure of the soil to erosive processes.
- b. Short-term removal occurs when vegetation is removed in small areas, but restored to suitable habitat within a fewer than 5 years of disturbance, such as a successfully reclaimed pipeline or successfully reclaimed drill hole or pit.
- c. Suitable habitat rendered unusable due to numerous anthropogenic disturbances
- d. Anthropogenic surface disturbance are surface disturbances meeting the above definitions which result from human activities.

Surface disruption: Resource uses and activities that are likely to alter the behavior of, displace, or cause stress to sage-grouse occurring at a specific location and/or time. Surface disruption includes those actions that alter behavior or cause the displacement of sage-grouse such that reproductive success is negatively affected, or the physiological ability to cope with environmental stress is compromised. Examples of disruptive activities may include noise, vehicle traffic, or other human presence regardless of the associated activity.

Surface use(s): These are all the various activities that may be present on the surface or near-surface (e.g., pipelines), of the BLM-administered lands. It does not refer to those subterranean activities (e.g., underground mining, etc.) occurring on the BLM-administered lands or federal mineral estate. When administered as a use restriction (e.g., *No Surface Use [NSU]*), this phrase prohibits all but specified resource uses and activities in a certain area to protect particular sensitive resource values and property. This designation typically applies to small acreage sensitive resource sites (e.g., plant community study exclosure, etc.), and/or administrative sites (e.g., government ware-yard, etc.) where only authorized, agency personnel are admitted.

Sustained yield: The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the BLM-administered lands consistent with multiple uses.

Technical/Economically Feasible: Actions that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant. It is the BLM's sole responsibility to determine what actions are technically and economically feasible. The BLM will consider whether implementation of the proposed action is likely given past and current practice and technology; this consideration does not necessarily require a cost-benefit analysis or speculation about an applicant's costs and profit. (Modified from the CEQ's 40 Most Asked Questions and BLM NEPA Handbook, Section 6.6.3)

Temporary/temporary use: This term is used as the opposite of the term permanent/ permanent use. It is a relative term and has to be considered in the context of the resource values affected and the nature of the resource use/activity taking place. Generally, a temporary activity is considered to be one that is not fixed in place and is of short duration.

Terrestrial: Living or growing in or on the land.

Threatened species: Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range (BLM Manual 6840, Special Status Species Management). Under the Endangered Species Act in the US, "threatened" is the lesser-protected of the two categories. Designation as threatened (or endangered) is determined by USFWS as directed by the Endangered Species Act.

Thriving Natural Ecological Balance: WHB are managed in a manner that assures significant progress is made toward achieving the Land Health Standards for upland vegetation and riparian plant communities, watershed function, and habitat quality for animal populations, as well as other site-specific or landscape-level objectives, including those necessary to protect and manage Threatened, Endangered, and Sensitive Species.

Timber: Standing trees, downed trees, or logs which are capable of being measured in board feet.

Timeliness: The lack of a time lag between impacts and the achievement of compensatory mitigation goals and objectives (BLM Manual Section 1794).

Timing limitation (TL): The timing limitation (TL) stipulation, a moderate constraint, is applicable to fluid mineral leasing, all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads), and other surface-disturbing activities (i.e., those not related to fluid mineral leasing).

Areas identified for TL are closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames. This stipulation does not apply to operation and basic maintenance activities, including associated vehicle travel, unless otherwise specified. Construction, drilling, completions, and other operations considered to be intensive in nature are not allowed. Intensive maintenance, such as work overs on wells, is not permitted. TLs can overlap spatially with NSO and CSU, as well as with areas that have no other restrictions. Administrative activities are allowed at the discretion of the Authorized Officer.

Total dissolved solids: Salt, or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts.

Total maximum daily load: An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

Trail: A linear route managed for human-power (e.g., hiking or bicycling), stock (e.g., equestrian), or OHV forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

Transition: A shift between two states. Transitions are not reversible by simply altering the intensity or direction of factors that produced the change. Instead, they require new inputs such as revegetation or shrub removal. Practices, such as these, that accelerate succession are often expensive to apply.

Transportation system: The sum of the BLM's recognized inventory of linear features (roads, primitive roads, and trails) formally recognized, designated, and approved as part of the BLM's transportation system.

Travel management areas: Polygons or delineated areas where a rational approach has been taken to classify areas open, closed or limited, and have identified and/or designated a network of roads, trails, ways, landing strips, and other routes that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose as well as clearly defined activity types, modes of travel, and seasons or timeframes for allowable access or other limitations (BLM Handbook H-1601-1, Land Use Planning Handbook).

Trespass: Any unauthorized use of BLM-administered land.

Tribal interests: Native American or Native Alaskan economic rights such as Indian trust assets, resource uses and access guaranteed by treaty rights, and subsistence uses.

Understory: That portion of a plant community growing underneath the taller plants on the site.

Unitization: Operation of multiple leases as a single lease under a single operator.

Upgrade (roads): Upgrade refers an improvement to a road that results in greater public use, use during more seasons of the year, and higher traffic speeds. Upgrading does not include repairing or re-aligning a road for resource protection reasons.

Utility corridor: A designated parcel of land that is either linear or areal in character. Utility corridors are not usually wider than five miles; are limited by technological, environmental, and topographical factors; and are set in width as identified by the special use permit or ROW issued. Designation criteria are set forth in Section 503 of F LPMMA for special use permits and ROWs; and 43 CFR 2802.11 for ROWs.

Valid existing rights: Documented, legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, ROWs, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

Vegetation Dynamics Development Tool: A model used to evaluate habitat trends into the future and compare effects of each alternative on vegetation.

Vegetation manipulation: Planned alteration of vegetation communities through use of mechanical, chemical, seeding, and/or prescribed fire or managed fire to achieve desired resource objectives.

Vegetation mosaic: Intermingled patches of vegetation that consists of a mix of vegetation types, age classes, structure classes, successional classes or a combination of these.

Vegetation treatments: Management practices which change the vegetation structure to a different stage of development. Vegetation treatment methods include managed fire, prescribed fire, chemical, mechanical, and seeding.

Vegetation type: A plant community with immediately distinguishable characteristics based upon and named after the apparent dominant plant species.

Visibility (air quality): A measure of the ability to see and identify objects at different distances.

Visitor day: Twelve visitor hours that may be aggregated by one or more persons in single or multiple visits.

Visual resources: The visible physical features on a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise the scenery of the area.

Warranted but precluded: When the public files a petition with USFWS to have a species listed under the Endangered Species Act, the USFWS can make one of three findings: listing is warranted; listing is not warranted; or listing is warranted but precluded. The warranted but precluded listing indicates that a species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

Watershed: Topographical region or area delineated by water draining to a particular watercourse or body of water.

West Nile virus: A virus that is found in temperate and tropical regions of the world and most commonly transmitted by mosquitos. West Nile virus can cause flu-like symptoms in humans and can be lethal to birds, including sage-grouse.

Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones: Greater Sage-Grouse management zones established based on populations across the entire range of the Greater Sage-grouse. Oregon falls into WAFWA Management Zones IV and V. WAFWA management zones are used in the cumulative effects analysis.

Wildcat well: An exploratory oil well drilled in land not known to be an oil field.

Wildfires *(separate from Wildland Fire) from NWCG #024-2010 Memorandum, April 30, 2010:* Unplanned ignitions or prescribed fires that are declared wildfires. Wildfires may be managed to meet one or more objectives as specified in the Resource Management Plan and these objectives can change as the fire spreads across the landscape.

Wildland fire: Any non-structure fire that occurs in the vegetation and/or natural fuels. Includes both prescribed fire and wildfire (NWCG Memo #024-2010 April 30, 2010. www.nwcg.gov).

Wilderness: A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its

preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value. The definition is contained in Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

Wilderness characteristics: Wilderness characteristics attributes include the area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include supplemental values. Lands with wilderness characteristics are those lands that have been inventoried and determined by the BLM to contain wilderness characteristics as defined in section 2(c) of the Wilderness Act.

Wilderness Study Area (WSA): A designation made through the land use planning process of a roadless area found to have wilderness characteristics, as described in Section 2(c) of the Wilderness Act of 1964.

Wildland fire use: *A term no longer used; these fires are now included within the "Wildfire" definition."*

Wildland-urban interface (WUI): The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Withdrawal. An action that restricts the use of BLM-administered land and segregates the land from the operation of some or all of the BLM-administered land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of BLM-administered lands to other federal agencies

Winter Concentration Areas: Sage-grouse winter habitats which are occupied annually by sage-grouse and provide sufficient sagebrush cover and food to support birds throughout the entire winter (especially periods with above average snow cover). Many of these areas support several different breeding populations of sage-grouse. Sage-grouse typically show high fidelity for these areas, and loss or fragmentation can result in significant population impacts.

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